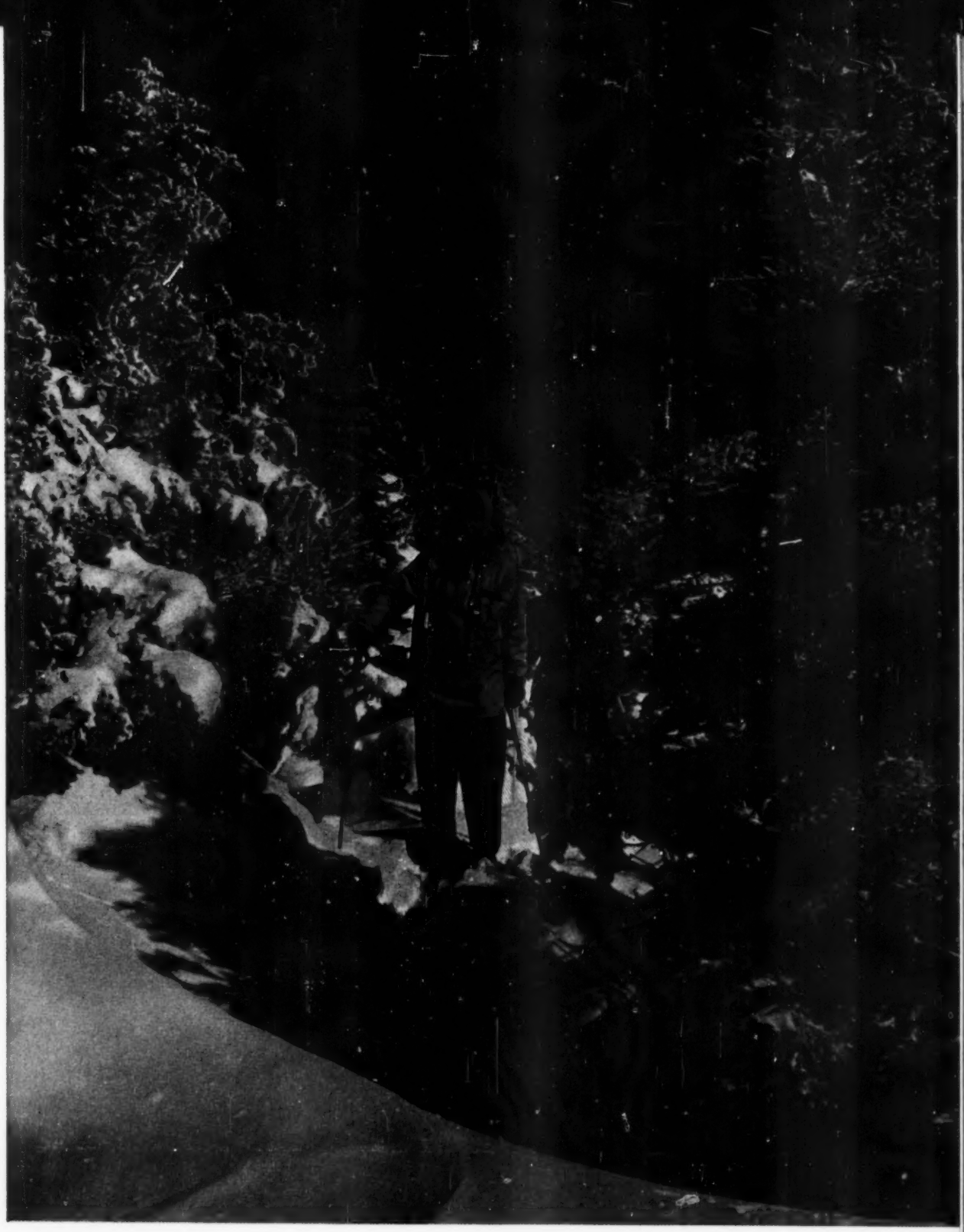

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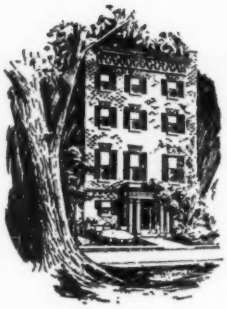

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THE COVER

"Any snow up there?" an AMERICAN FORESTS editor asked George Bartter, of *Vermont Life*, when he called Montpelier on December 6 about a possible Vermont Development Commission cover for January. "I'll say we have—tons of it," Bartter chortled happily, "You should see them skimming down Mansfield." Lots of snow—like that in Mack Derick's crisp January cover—was most welcome to Vermont winter sports enthusiasts after the lean season of last year, Bartter admitted. AMERICAN FORESTS is proud to present this snow picture from *Vermont Life*—one of the nation's most handsome quarterlies, that presents a continuing portrait of an unusual state with all its color, beauty and warmth of tradition. For more winter sports news turn to our 1950 preview starting on page 16.

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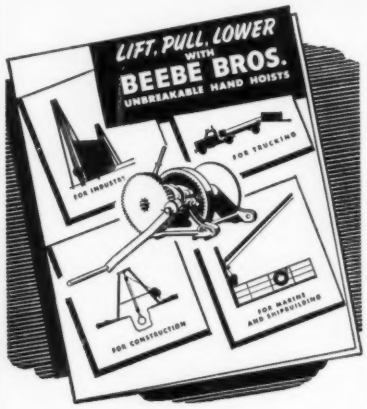

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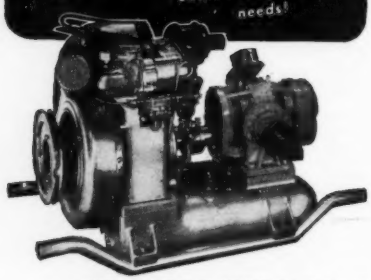

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LETTERS TO THE EDITOR

Less Lights, and More Trees!

The December issue, with its attractive cover, is before me as I write. The magazine is always very welcome in this household, and its coming is a continuing reminder of the forests, and of the need for forest preservation.

We are usually wholly in harmony with the ideas advanced by your writers, and your editorial comment finds us in agreement with you nearly always, but the editorial "Trees of Light," strikes a discordant note by reason of our views on the subject of the modern Christmas tree.

We like simplicity in Christmas trees. We believe that the tree, as a beautiful symbol of life at its finest, conveys its message of the evergreen memories aroused as related to the chief holiday of the winter season.

We have observed for some years the growing trend toward loading the tree with strings of wires which are filled with quantities of electric lamps, resulting in a "tree of light," and thus the firs, spruces and the rest are beacons of colored light. The tree is obscured, and the lights become the display.

Not so long ago, before there was competition in Christmas display, there were a few lights added to the foliage, half concealed, so that nothing should detract from the beauty of the tree. Then we had our Christmas trees, as such, and not media for advertising some chosen spot which the display artist intended to advertise, and to whom the tree became something upon which to hang the lights. Before long we shall have one of the trees showing in special lights, "Try Umptedo's Tooth Paste."

We like trees. We regard them as wonderful, satisfying creations, which bring "health to the soul," as the ancient poet put it.

Less lights, and more trees!

Mason Barlow
Rutherford, New Jersey

Something to Live Up To

The American Forestry Association is to be highly complimented on its outstanding accomplishments and high ideals. I have been fortunate in being able to study your program, both through AMERICAN FORESTS, and by riding with the Trail Riders of the Wilderness on their Flat Tops Wilderness Expedition in 1948. I am wholeheartedly behind you in all that you do to protect and develop the forests and wilderness areas of our great country for generations to come.

I would also like to take this opportunity to express my thanks to the editors of AMERICAN FORESTS for the outstanding job they are doing. Their clear thinking and up-to-the-minute information are unsurpassed by any other publication of its kind. In short, seeing all these men working, planning, writing and, if necessary fighting to keep this great nation of our's beautiful and productive, I feel very honored to be called a member of The American Forestry Association.

Hugh J. Tenbusch
Detroit Gas Burner Company
Detroit, Michigan

For "Ding" and Duff

As a lifelong sportsman, I hereby take off my hat to Jim Duff for his frank article in the November issue of your magazine, "Let's Outlaw Pollution!" But even more hard-hitting and effective, in my judgment, was J. N. Darling's superlative cartoon on the same subject. That cartoon should be sent to every member of Congress and hung on the wall in every American schoolroom. "Ding" and Duff make a good conservation team.

George N. Thomas
Chicago, Illinois

Support for State Foresters

I appreciate very much the resolution adopted at your Sixty-Eighth Annual Meeting reaffirming the association's beliefs and commending the progress made by the states and the forest industries in achieving important forestry goals. I trust that your association will continue to back us up in our efforts to fulfill the challenge of accepting greater responsibility for dealing with forest conditions and needs.

Joseph F. Kaylor, President
Association of State Foresters
Annapolis, Maryland

Two Viewpoints on General Bradley

In inviting General Omar N. Bradley to participate in its annual meeting and giving his remarks full coverage in the November issue of AMERICAN FORESTS, The American Forestry Association is exhibiting a realistic attitude both in regard to natural resources requirements for national defense and hoped-for control of atomic energy.

Wrestling with such problems as the atom bomb and future defense requirements of our nation is something in which every American should be vitally interested, and in inviting General Bradley to take part in your association's discussions your members showed, in my opinion, a very sane and healthy attitude.

My experience with conservation organizations in the past—somewhat limited, it must be admitted—has been that they have a tendency to shun some of the more basic problems involving the whole future of humanity. As a result, they have sometimes failed to come to grips with really basic issues.

Your association's attitude, therefore, in inviting a great American general to your deliberations is cheering and indicates a willingness to take a broad view in dealing with our problems—a view, which if adopted more generally, should greatly help not only to solve our immediate pressing problems, but also serve to safeguard the forests which have been your major interest for so many years.

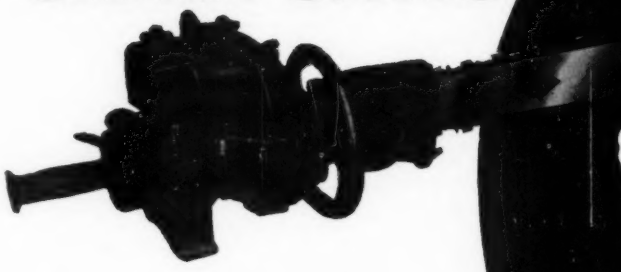
Thomas F. Jones
San Francisco, California

It is certainly quite extraordinary to find The American Forestry Association presenting General Omar Bradley at your annual meeting as "one of the key conservationists of our time." My objection, naturally, does not stem from any fault in the General's personal character or integrity,

TITAN

BLUESTREAK

CHAIN SAWS



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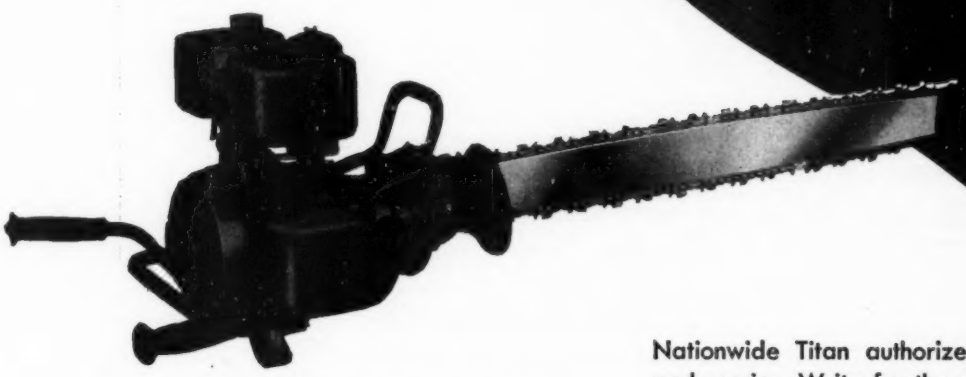

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nor in his reputation as a great leader. Rather, from the kind of business he typifies to the world, namely, war.

Surely it does not require much proof to assert that modern war is man's most destructive activity. It spells waste and ruin for the precious irreplaceable natural resources of the world. Nothing has done more damage to our forest lands than two world wars. In New England during the war and its aftermath our forests have been stripped of trees that should have been given another half century to grow. In a period of drought even we have to worry about water, partially because the water-holding capacity of the countryside is being destroyed.

So, from my viewpoint, the last person that should have been chosen to illustrate the virtues of conservation is anyone whose main business is war, the great destroyer of the earth's resources.

Clarence F. Avey

Athol, Massachusetts

Vanishing Water

I own and operate a string of ranches on the Sacramento-San Joaquin Valley floor in California. On one, in 1922, I sank three wells. Water then was obtainable in seemingly unexhaustible supply at twenty to fifty feet. Later, at frequent intervals, I bored six more wells.

In 1949 I bored well No. 10. It now is necessary to penetrate 300, 350, even 400 feet. Wells Nos. 1, 2 and 3 today produce no water. Recently it has been necessary to tap lower reserves on well No. 4. Here is a constantly lowering water table. As one pumpman remarked, "Sacramento Valley eventually will be as dry as Fresno-Bakersfield Desert in 1880."

What causes above desiccation? One factor is the constant timbering of the forest. In the early 1900's I horsebacked several days through magnificent virgin sugar pine. This territory now has been logged. In another part of the Sierra two logging operations were running side by side. One was handled under a cropping strategy which insures a continual cut, decade after decade. Over its line, however, the other company slashed and burned ruthlessly, destroying the natural spongy forest cover. Heavy subsequent rainfall washed the soil down to the bare rocks.

C. M. Goethe

Sacramento, California

Good Conservation

I like the layout of our magazine. Well done. I'm mildly amused at a tree conservation magazine devoting its inside cover to an ad for a tree-destroying machine. Naturally, however, good conservation includes intelligent cutting for sustained yield.

Thornton Conron

Memphis, Tennessee

On the Right Track

The articles appearing in AMERICAN FORESTS are being written more and more for the general public rather than for men engaged in forestry, and I think that is the class of readers which the magazine should try to reach. If a person is interested in the technical phases of forestry, he can turn to the numerous good journals now being published as well as other scientific papers. We need more good general conservation magazines, I think, and AMERICAN FORESTS is going a long way to satisfy that need. I want to wish you continued good luck in that field.

Orville C. Barton, Jr.
U. S. Forest Service

Young, Arizona

It's in the Works

I have just finished reading *Knowing Your Trees* and would like to compliment you on it.

I have read many book on American trees and this beats them all. It gives excellent coverage to each tree but doesn't include such prominent trees as the willows, palms, and mesquite, to mention a few.

Would it be possible to publish another volume? Here's hoping.

William E. Reneau

Atlanta, Texas

Third World Forestry Congress

This summer I had an opportunity to attend the Third World Forestry Congress held in Helsinki, Finland, as a representative of the Ohio Forestry Association. Five hundred foresters, industrialists and technicians from thirty-two different countries met to exchange views and experiences and to establish or renew personal relations which will stimulate their work in the coming years. There were twenty-two congress members from the United States.

The congress was organized into five sections for consideration of silvics and silviculture, forest surveys, forest economics including forest policy, forest utilization and forest industries.

The Finns, under the leadership of Professor Eino Aaari, did a superb job of organizing the congress. Such matters as money exchange, room assignments, daily program announcements and invitations to social events were all handled courteously and efficiently. The only complaints which could be overheard centered around the strenuous schedule which accompanied the long days and the short nights. As one American who suffered from lack of sleep expressed it, "The hospitality of the Finns is 'crushing'."

Multilithed copies of *Who's Who in the Congress,* summaries of special papers of the various sections, the daily *Congress Digest* and the detailed *Excursion Guide* are only a few examples of the valuable publications which the members received during the congress. The Helsinki daily newspapers carried a special section of news in English—and the attention paid to forestry by the Finnish press was impressive.

One of the most interesting and profitable features of the congress was the various excursions throughout the country. The organizing committee arranged twelve four-day field trips during the period July 6 to 10. About thirty of us chose excursion No. 6 which went through southwestern Finland. We traveled by train, bus, and boat and when we got into the woods we did quite a lot of walking. We visited several large sawmills and other wood-using industries. On two occasions we got to shipbuilding plants just as boats were being launched for delivery to Russia as war indemnity.

To me, the most interesting part of this field trip was a visit to the home of a Finnish farm family. Mr. and Mrs. Anto J. Kahala are in their forties and have five children. They entertained us in their home and while they did not speak a word of English, one could feel their friendly spirit.

An important part of the visit to the Kahala farm was the walk through their pine forest. There were 170 Scotch pines to the acre, aggregating 7045 cubic feet and growing at the rate of seventy-nine cubic feet a year. The Kahala farm consists of 128 acres in fields and 321 acres in forest, which appears to be a well-balanced economic unit in Finland.

The owner told us through an interpreter that he was pleased to show the fine forest, which he inherited, and expressed his intention to preserve it and hand it on to his children in an even better condition than he received it. This forest has been in the family for over 300 years.

Other interesting phases of this excursion included visits to well-managed forests growing on a variety of soils and under different classes of ownership.

On the morning of July 10, following the excursions, the congress was formally opened by President Paasikivi, who stated in his address that there is hardly another country in which forests rank as high in national economic importance as in Finland. He further stated that since Finland's economy is greatly dependent on international trade, the representatives of forestry and forest industries are keenly interested in international cooperation. That is the reason the Finns were pleased to accept the task of organizing the Third World Forestry Congress, which was accomplished through cooperation with the Food and Agriculture Organization of the United Nations.

It is not possible to review here the many papers which were delivered at the various sections of the congress. These will be included in the *Proceedings of the Congress,* along with the general report which contains numerous conclusions and recommendations agreed upon by some of the most prominent representatives of forestry in the world.

To quote briefly from the general report: "The work of the Congress has revealed certain trends which become particularly apparent against the background of the first and second world forestry congresses. . . . The protection of forests from destruction, the establishment of forest inventories, the systematic management, the reduction of waste, the improvement of wood utilization and raising the consumption of forest products in the interest of higher standards of living are objectives which have moved from the sphere of discussion to that of generally accepted truths."

It is apparent that the end result of the Third World Forestry Congress, where topics such as the above were considered on a worldwide basis, should result in the improvement of the forestry programs in all the countries which participated.

Oliver D. Diller

Wooster, Ohio

Picture Credit

AMERICAN FORESTS regrets its failure to credit Bachrach, Incorporated, for the excellent character study of General Omar N. Bradley that appeared on page six of the November issue in connection with the article entitled "The Red Atom." AMERICAN FORESTS is glad to credit Bachrach, Incorporated, for a picture that has brought in favorable comments.

How will they look to YOU a few years from now?

Your wife's eyes: What will you read in hers when she asks whether you can afford that modest cottage that's for sale?

Your boy's eyes: What will you see in his eyes the day he asks whether you can afford to send him to college?

Your own eyes: What will the mirror tell you about them when it's time to retire, and take things easier?

There's no better time than right now to sit back and think what *you* will see in your family's eyes a few years from now.

Whether they glow with happiness or turn aside with disappointment depends, to a very large extent, upon what you do *now*.

So plan *now* for that home you plan to buy eventually . . . set aside money *now* for his college education . . . plan *now* for the day you can retire.

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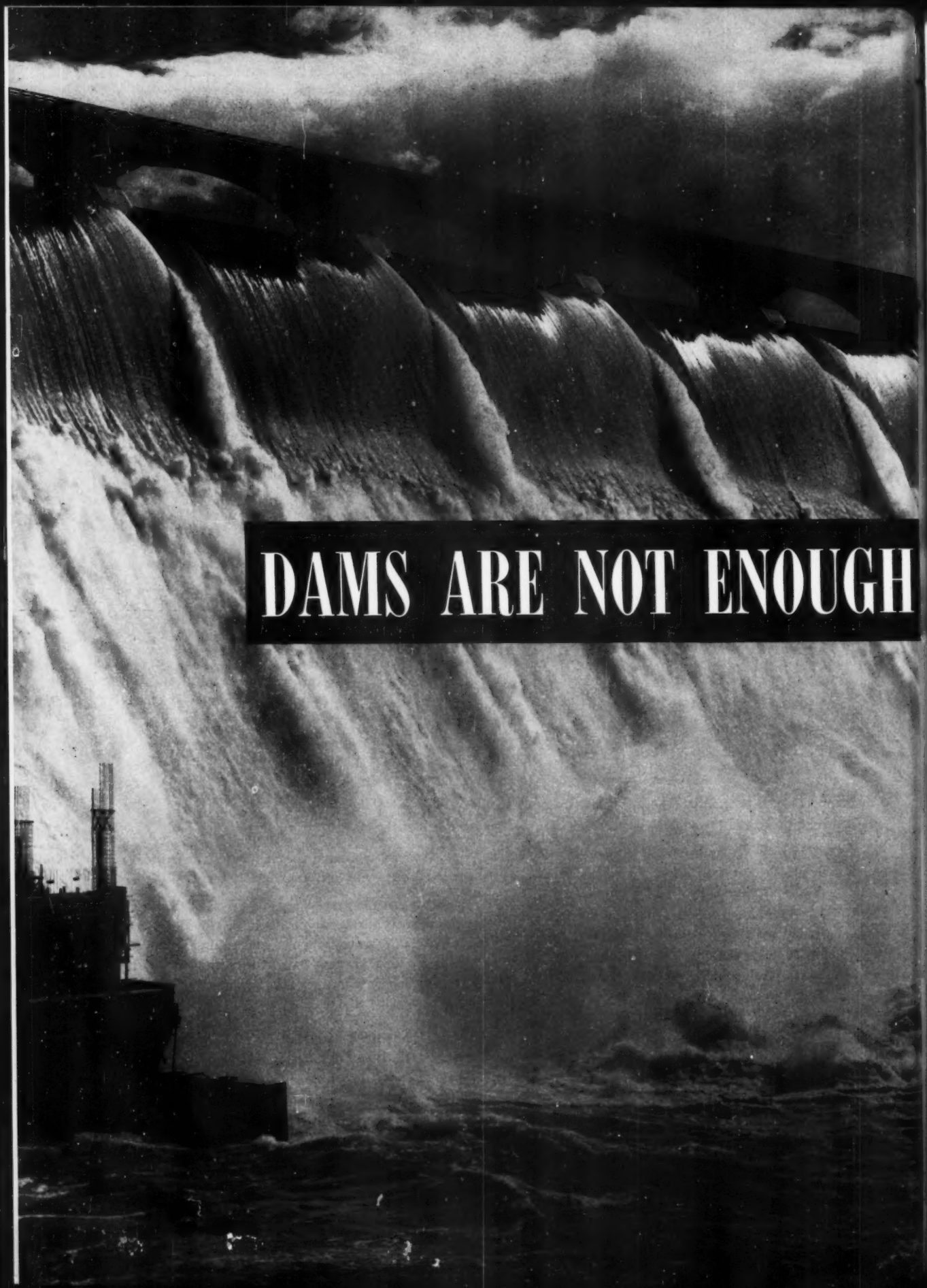
DAMS ARE NOT ENOUGH

Will our great dams stand one day as useless monoliths symbolizing incredible faith in an engineering approach that failed to solve our water problems? Or will we stop our piecemeal planning in time and combine sound watershed practices with practical engineering methods? This probing study, the first of three parts, provides revealing answers

By BERNARD FRANK and ANTHONY NETBOY

ALTHOUGH water problems in the United States are growing apace, the manner in which we are trying to solve them seems to become steadily more confused. With the federal government providing the bulk of the outlays, we are striking out in many directions and using a variety of devices to tame unruly rivers or exploit them for constructive purposes. But often we seem to solve one problem only to create others. And frequently the human by-products of these solutions produce social and economic maladjustments which baffle the communities that must cope with them.

The Hoover Commission task force on natural resources dramatically highlighted in its majority report our bewildering approach to water problems. Further evidence of this bewilderment was curiously provided in the long deadlock between the House and Senate on the bill appropriating funds for flood control and navigation projects to be undertaken by the Corps of Engineers in the fiscal year 1950. The House objected strongly to more than a dozen projects added by the Senate. Representative Cannon of Missouri, a member of the House Appropriations Committee, branded the Senate-added flood control and navigation projects (estimated to cost over $500,000,000 to complete) as "junk," thus inferring that they were a waste of the taxpayers' money.

The control of floods still remains one of our outstanding water problems. The agencies which have been studying this matter indicate that the annual losses to crops, structures and other property, in dollar terms alone, are far higher than most of us realize. The watershed flood control surveys of the U. S. Department of Agriculture reveal, for instance, that at least half of all flood and sedimentation damage is due to the smaller, more frequent floods on the smaller upstream reaches of our drainages—and the balance to the less frequently flooded main rivers and their larger tributaries. This revelation throws an entirely new light on flood ravages. Earlier estimates of annual losses, ranging from $100,000,000 to $300,000,000, are now found to be much too inadequate. Thus, as of 1947 conditions, damage on the major streams alone, as estimated by the Corps of Engineers, average $466,000,000 each year. On this basis, the annual damage from flood—both large and small throughout the United States would seem to be in the neighborhood of one billion dollars.

These figures indicate the magnitude of the flood problem alone. Other major water problems—described in various articles in AMERICAN FORESTS in the past two years—are serious shortages of water not only in the West but in numerous localities in the humid East; uncertain, unsatisfactory, and more costly supplies for fast-growing municipalities in all parts of the country; and increasing pollution of most of our important streams.

How are we as a nation going about the correction of these economically burdensome situations? Which methods have been successful? Which found wanting? How can we evaluate the various correctives that are being advocated by scientists, engineers, land managers, businessmen, politicians and others who have a voice in the solution of our water problems?

In this article we shall deal only with the engineering approach—at present the most popular and spectacular—its benefits and shortcomings. Subsequent articles will analyze the two other major approaches—land-use correctives and river-basin (watershed-wide) development schemes.

The way we have gone about the taming of the Mississippi illustrates our general approach to the flood control problem. The majestic Mississippi is renowned as a shifting, mercurial river. It has altered its channel frequently over the centuries, cut across bends, scoured out one section and filled in another, twisted, curled, and spiraled across the vast fertile valley. These curious adjustments, which have baffled and harassed river pilots from Mark Twain's day to ours, only reflect the heavy discharges of water and sediment into the main stream by numerous tributaries.

Up to relatively recent years attempts to confine "Ol' Miss" within reasonable bounds, at first primarily for navigation and later for flood protection, was solely in terms of dikes and levees, supplemented by occasional dredging and other temporary measures. But as far back as 1850 Charles Ellet, a competent engineer, warned the nation that levees alone could not hold back the

About the Authors

Netboy

Frank

With the engineering approach to water problems covered in this issue, the authors in February will turn their attention to the land use solutions and in March to the mirage of river basin development. Opinions expressed in these articles are solely those of the authors and do not express the views of the agencies with which they are or have been connected. Bernard Frank is Assistant Chief of the Division of Forest Influences of the U.S. Forest Service. Anthony Netboy is a former editor of the Forest Service. The articles in this series are based on their book, *Water, Land and People*, to be published this year by Alfred Knopf, Inc.

Soil Conservation Service

Sound watershed practices once brought up to date and combined with engineering measures should help curb destruction of the type caused by the rampaging Smoky Hill River in Kansas

torrential masses of water which the mighty Mississippi was capable of delivering at vulnerable places. Yet for over seventy-five years engineers like Ellet were regarded as calamity howlers. The flood waters came and men threw up more and higher levees until the catastrophic inundations of 1927 finally convinced engineers that banks of earth fortified by innumerable bags of sand or massive layers of stone could not hold back the river at crucial moments.

In the last two decades less and less reliance has been placed on levees, and the flood control problem on this wide, shifting river has been attacked with a varied array of weapons. Engineers have diverted and dissipated the flood waters into floodways, dredged long stretches of the channel, and built impressive flood storage reservoirs on the lower tributaries. Still, the Mississippi is far from tamed.

With abandonment of the "levee only" idea, engineers turned to reservoirs as a means of achieving flood control. The practicability of using storage basins to retard flood waters was first demonstrated on the Miami River in Ohio, following the disastrous flood of March, 1913, which took 400 lives and destroyed over $100,000,000 worth of property. Here effective control was achieved by a combination of local channel improvements and an integrated system of five reservoirs with fixed outlets designed to release a determined amount of water gradually into the channel below each dam. The dams are large enough to hold back the equivalent of four and a half inches of rainfall over 3500 square miles of watershed. No attempt is made to store water behind the dams; instead, they are allowed to empty themselves automatically after each rain.

This method of flood control, essentially devised by Arthur E. Morgan, later chairman of the Tennessee Valley Authority, permits of the continued use of agricultural land in the reservoir areas, since only occasionally are the rains heavy enough to fill up the basins for any appreciable period. The Miami project is also notable for the fact that it was developed and financed locally, without federal aid. Enactment by the state of Ohio of a conservancy districts law—the first in this country—made possible the organization and functioning of the Miami Conservancy District which operates the flood control facilities.

The success of the Miami project led engineers increasingly to resort to reservoir construction in attempts to impose a measure of discipline on unruly rivers.

In the last two decades greater emphasis has been placed on multiple-purpose reservoirs. It has been found economically feasible to combine flood control with other purposes such as hydroelectric power generation, navigation, and provision of water supplies for irrigation or domestic use. Although there is a running controversy on the merits of single-purpose versus multi-pur-

Displacement of people for dam projects inevitably poses tragic human problems. North Dakota Indian openly wept when Secretary Krug signed contract whereby the tribe sold its land for the Garrison Dam Project

Wide World Photos, Inc.

pose structures, especially where control of flood discharges is a major desideratum, the multi-purpose project has firmly dominated the thinking of federal agencies especially since the Omnibus Flood Control Act of 1936. For example, the Bureau of Reclamation, in its ponderous 1946 report on the Colorado, proposes 134 projects or units of projects, mostly multi-purpose, on this river alone!

II

The most spectacular and complete network of navigation channels, dams and reservoirs and power facilities has arisen on the Tennessee and its tributaries, built at a cost of some $700,000,000. Flood regulation achieved by this integrated system of twenty-six structures has manifestly reduced damages at Chattanooga and helped to reduce river heights on the lower Ohio and Mississippi. The Tennessee itself has been converted into a series of slack-water lakes that provides a nine-foot navigation channel—still far from fully used—from the mouth of the river at Paducah, Kentucky, to Knoxville, Tennessee, a distance of 630 miles.

As the water impounded behind the dams is released from one lake to the next, the energy is converted into electric power. Combined TVA steam and hydro facilities have an installed capacity of 2,600,000 kilowatts which furnish low-cost electricity—for cooking, heating, lighting, refrigeration, industrial motive power, traction, etc.—to over 850,000 consumers scattered over 80,000 square miles in Tennessee, Alabama, Mississippi, Georgia, Kentucky, North Carolina and Virginia. Other benefits from TVA reservoirs include recreational facilities, malaria control, and habitats for fish and waterfowl.

III

The mammoth dams and storage basins built in the United States provide indisputable economic and social benefits. But there are many drawbacks which their sponsors frequently overlook or soft-pedal. Thus much productive land must be permanently flooded to make way for reservoirs. The dams built by TVA through 1947, for example, required the inundation of a sizable domain —467,000 acres at normal pool levels, of which 298,000 acres were crop and pasture lands from which several thousand families were deriving a livelihood.

In areas where sedimentation rates are high—that is, where a great deal of silt is constantly washing off eroding lands—costly reservoirs and dams are eventually doomed to uselessness, no matter what their initial benefits may be, unless the cover and soils on the watershed can somehow be rehabilitated. For example, the builders of Lake Mead, the 115-mile reservoir behind Hoover Dam, considered it necessary to reserve from sixteen to twenty-five percent of its total capacity of 32,360,000 acre-feet for the storage of enormous masses of silt that are bled off the erodible soils of the Colorado River watershed. Additional dams are planned upstream to check the inflow of sediment into Lake Mead in an effort to extend the useful life of the gigantic reservoir.

The consequences of the failure to pay adequate heed to the scourge of sedimentation is indicated by a survey made by the Soil Conservation Service a few years ago. Over two thirds of the 10,000 reservoirs in the United States, costing some $5,000,000,000, have a useful life of less than a century and only about fifteen percent can be expected to last over 200 years. For example, at present siltation rates, Lake Mead—America's largest storage reservoir—will be so choked with mud after some 125 years that its storage capacity will be largely used up. Should this happen, the value of Hoover Dam will be considerably diminished and the four million persons who depend on it, partially or wholly, for their water and power will be in dire trouble.

So serious is the problem of maintaining the capacity of reservoirs supplying irrigation water in the

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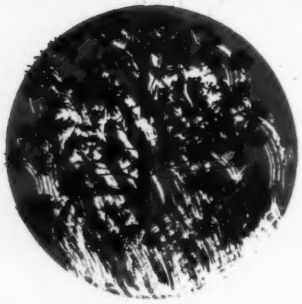
U. S. Forest Service

As indicated by SCS surveys, failure of engineers to pay adequate heed to the scourge of sedimentation will greatly reduce the useful lives of many dams. Silt in Mono Dam reservoir, California, is an example

Lightning in the Longleaf

By H. H. CHAPMAN

Photos by U. S. Forest Service



How the most fire-resistant tree in America, the South's valuable longleaf pine, got that way — and why today's management plans must recognize its dependence on fire

IT is now generally accepted that the longleaf pine as a species owes its existence and perpetuation to surface fires. Not merely is it the most fire-resistant tree in America, from the seedling stage on, but its dependence on fire, in its struggle for survival, is complete. And since the evolutionary development of this unusual tree started millions of years ago, long before the advent of man, the only logical explanation is lightning.

In fact, there is no other explanation. The only natural cause of fire in the absence of man is lightning. Furthermore, these lightning fires had to occur with a frequency and ability to spread sufficiently to overcome competition of less fire-resistant species by killing them back, to prepare the ground for seed and to check, in part at least, the ravages of disease. That they did is indicated by the abundant evidence available to researchers today.

Witness, for example, the fact that sites on which original longleaf pine forests grew had a characteristic ground cover, highly inflammable, of broom sedge, wire grass, sweet fern and gall berry. The grasses rapidly form a "rough" composed of a loose layer of dead stems up to six inches or more in depth, which can be ignited and will burn readily within an hour or two after rains.

This is significant in view of the fact that lightning in the longleaf pine belt is usually accompanied by heavy rains. As to the spread and area that could be covered by lightning fires, several factors were important. First, of course, is the almost immediate drying out of the "rough" after a rain, permitting a fire to burn freely. Then there was the absence of artificial firebreaks such as roads and cultivated fields. Finally, the continuity of the pine type, broken only by valleys and streams, offered no serious obstacle to the flames. And these virgin pine forests were filled with scattered dead trees and down timber; dead trunks, stumps and knots that were resinous and durable.

A fire set by lightning under these conditions might spread promptly and burn indefinitely.

As evidence of what might have occurred in past ages, it is enlightening to review the frequency with which lightning has set fires in the longleaf belt under present conditions. From 1940 to 1947, according to the U. S. Forest Service, a total of 613 lightning fires required control measures on national forests in five southern states — Alabama, Florida, Louisiana, Mississippi and Texas. Of these, 191, or an average of twenty-four fires a year, were in longleaf pine. The area of national forests in

these five states is 9,097,577 acres — the total forest area 102,609,000 acres. Applying the indicated ratio of 9.2 percent, it is probable that the total number of modern lightning fires for all forests in these states for eight years was 6664, or 833 a year.

This number of lightning fires does not appear serious until the differences in behavior and probability of spread between the longleaf and the remaining forest types are considered. Furthermore, it is safe to conclude that due to clearing, snag removal, use of stumps for distillation, etc., the probability of a lightning fire escaping in the primeval longleaf forest was at least double that under present conditions.

The area of pure longleaf forest land in the five states listed is 22,943,000 acres. Even twenty-four fires a year gives an incidence of one fire annually on 955,958 acres. But annual fires are destructive of seedlings. It can therefore be assumed that natural fires did not, need not, and should not have occurred every year. Once in three years would be ideal. The hit or miss averages by which natural processes work can safely be assumed to have widened this interval of occurrence beyond one year. If fires every three years gave best results, and the species survived to the exclusion of its competitors for millions of years — which it did — a three-year, not a one-year fire interval can be taken as a gauge of the effective occurrence of lightning fires in the ancient forests.

This would reduce the present average acreage per fire to one third, or 318,652 acres. But the far greater probability of fires getting away in the virgin forest cannot be overlooked. Doubling the probable incidence of fire is a conservative presumption. Thus the area must again be reduced by one half, or 159,326 acres per fire, in order to approach the frequency needed to protect the longleaf seedling from its mortal enemies, shade and brown spot disease.

An area of 159,326 acres is equal to 249 square miles, forming a square 15.78 miles in diameter. Uncontrolled fires in the longleaf pine "rough" are known to have traveled at a rate of more than one mile and up to four miles an hour. At a rate of two miles, a fire could cross such an area in eight hours. Yet these fires could burn indefinitely. There was nothing to stop them until it rained.

Longleaf pine is long lived, averaging 250 years before the seed-bearing trees disappear from insect attack, rot, wind, and fire itself. Hurricanes have left their mark throughout the region, leveling strips of virgin timber. Fires following these blowdowns would effectually clear the land for new seedlings.

That lightning fires occurred with sufficient frequency to enable the species to survive in pure stands must be accepted, for no other explanation of the existence and remarkable characteristics of the longleaf pine is possible.

Let's look at these characteristics a little closer. In adapting itself to survive fires which might occur at intervals so frequent that its competitors among pines and hardwoods would be killed in the seedling stages, the longleaf pine seedling germinates in the fall, thus establishing a deep root system to resist drought; it postpones height growth until the thickness of the stem at ground level reaches one inch; it stores food in the root, thus enabling it to produce new needles

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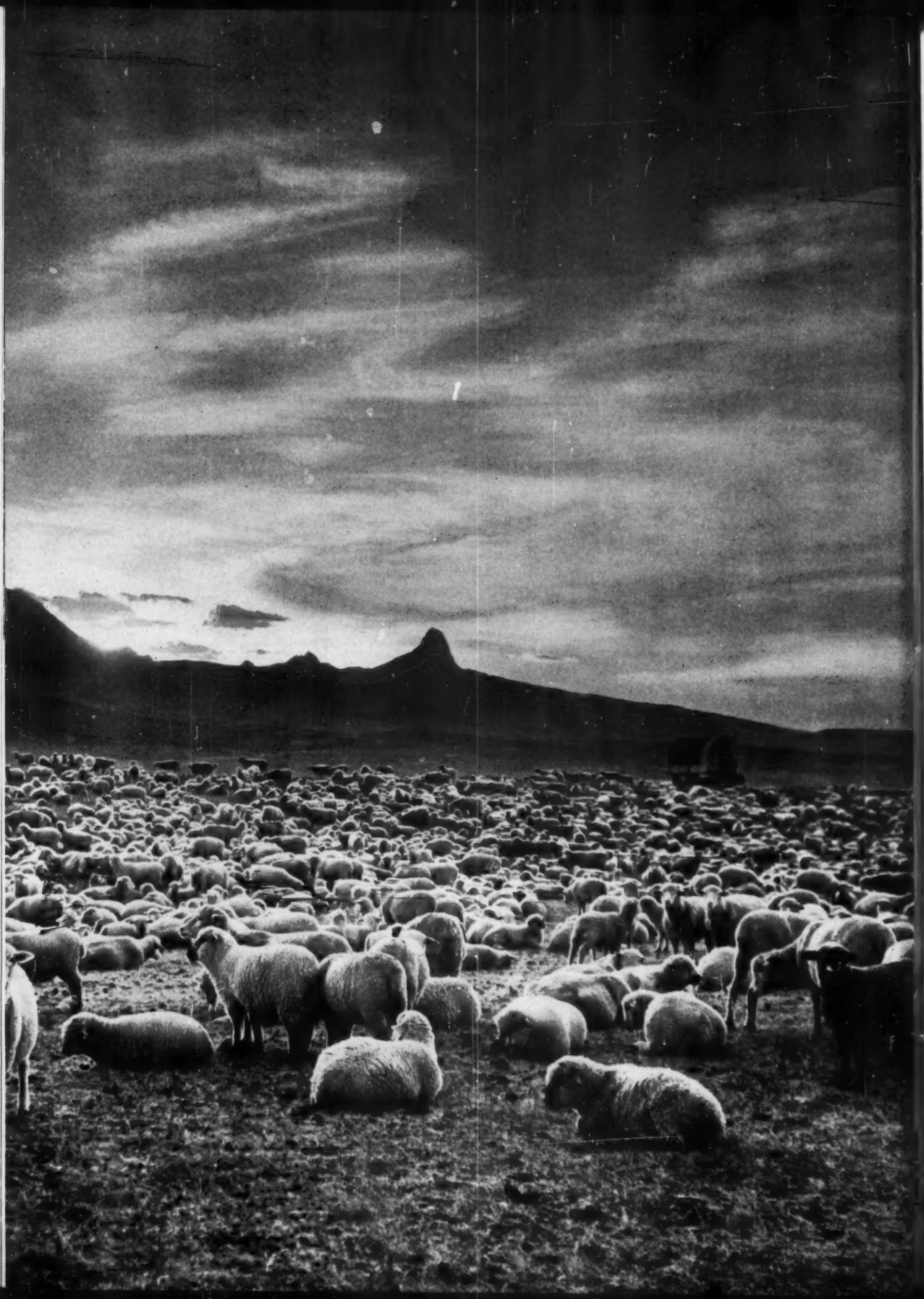
Controlled burning at prescribed intervals is part of present-day management of natural reproduction areas

One of the few remaining virgin longleaf stands in the South. This fine tract is located near Trout, Louisiana



The People's Land

Should Uncle Sam relinquish his stewardship of 400,000,000 acres of public lands? No, says the Hoover Commission Task Force on Natural Resources

PROPOSALS frequently have been made that the federal government relinquish in whole or in part its stewardship of certain public lands by effecting transfer of the lands to the states or to private ownership. Through many years this question in one form and another periodically has been made a public issue that has drawn heavily upon the time of Congress, confused the public as to national policy, and reduced the efficiency of the administrative agencies charged with administration of the lands concerned.

The task force on natural resources of the Hoover Commission (Commission on Organization of the Executive Branch of the Government) has felt obligated to study the merits of a disposal of public lands not only from the standpoint of economy and national welfare but as a premise to other recommendations respecting functional organization and operation of the natural resource agencies. Obviously, a policy of disposal calls for a different form of agency organization than does a policy of permanent federal tenure, protection and development of public lands. In its consideration of the question, the committee (task force) has sought to appraise public land resources in the light of their relation to the future no less than the present domestic and world outlook. In doing so, it has given special weight to:

1. The resources inherent in the remaining public lands and their importance to the economy of the regions in which they are located and of the nation as a whole.

2. The effects of a policy of liquidation, piecemeal or otherwise, upon the resources involved, the future well-being and security of the nation, and the possible consequent costs to the people.

3. The obligation of the federal government to the will of the American people as expressed during the past fifty years by many acts of Congress and by the expenditure of great sums of money for the administration, conservation and development of these resources.

Consideration of these and related phases of the question has left no doubt in the mind of the committee that the present conservation policy of the government with respect to public resource lands should be firmly maintained. It recommends strongly, therefore, against any policy looking to the dissipation of the lands by transferring them to the states or by placing them on the market for private acquirement. The considerations which led the committee to this recommendation are summarized as follows:

The people's land, as the public domain has been called because title rests in the federal government which serves as agent of all the people, embraces more than 400 million acres in the continental United States. It is made up of those lands which now remain after disposal of some billion acres of the nation's original public domain, and in addition of fifty million acres which the federal government has acquired largely in recent years by purchase, donations and land exchange. Of this vast area approximately eighty-five percent is in large holdings which in the course of the last fifty years have been set apart by special acts of Congress for the conservation of their soils, waters, forests, forage and other resources. These are the national forests, national parks and monuments, wildlife refuges, grazing districts, and Oregon and California grant lands.

The committee's recommendation also applies to those areas of the unreserved public domain which, because of their resource values or their beneficial influences upon waterflow and soil stability, will best serve the public interest in federal ownership. The area of unreserved public lands is placed at some forty million acres.

The present reservations are the accumulated results of a policy of public-land conservation entered upon by the people of the United States at the close of the last century. It is significant that the policy had its inception during the period of reckless public-land disposal and private exploitation and that it sprang spontaneously from a popular awakening to the need of safeguarding for the use and benefit of all the people the natural wealth remaining in the public lands.

Beginning with the reservation of the area which is now the Yellowstone National Park, set apart by Congress in 1872 to preserve for all time this scenic wonder of nature for the benefit and enjoyment of the people, the policy was broadened during the 1890's to include economic values of the public lands. During

THIS COGENT statement affirming the retention of the public lands in federal ownership is from the Task Force Report on Natural Resources (Appendix L) prepared for the Hoover Commission. These lands represent a conservation investment by the people, the report declares, and there is no evidence that the people wish to see this investment dissipated. Copies of this report or any other statements dealing with the work of the Hoover Commission can be obtained by writing the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C.

that decade Congress passed the acts of 1891 and 1897, which authorized the President to withdraw for permanent federal administration portions of the public lands bearing timber and brush for the purpose of securing favorable conditions of waterflows and to furnish a continuous supply of timber for the use and necessities of the citizens of the United States.

During the succeeding fifty years, this policy of public-land retention and conservation was strengthened and broadened by many supporting acts of Congress, notably the Taylor Grazing Act of 1934. Three great systems of public-land reservations—the national parks, the national forests, and the grazing districts—have resulted, and altogether some 345 million acres of public lands have been brought under conservation administration. These statutes and accomplishments clearly define the present policy of Congress, acting in response to the will of the people, as one of conservation and development of public-land resources under federal stewardship in order that they may best serve present and future needs of all the people. They have completely reversed the old easy-go policy of public-land disposal and have left a relatively small percentage of the remaining public lands to the vagaries of that policy.

As of July, 1948, the policy as incorporated in specific acts of Congress embraced the following classes of public land reservations:

	*Net area in acres**
National forests	180,000,000
National parks and monuments	20,500,000
Grazing districts	132,000,000
O. & C. grant lands	2,500,000
Wildlife refuges	10,000,000
Total	345,000,000

*As reported by Federal agencies for July 1948.

The magnitude of these holdings and the natural resources they embrace make them one of the great national assets of the American people. Within their boundaries are:

The watersheds of streams and rivers forming the main sources of water for industry, irrigation, electric power and municipal uses in eleven western states.

One third of the commercial sawtimber standing in the United States —now supplying more than ten percent of the annual lumber cut.

Over 200 million acres of range lands—now providing seasonal grazing for fourteen million head of western livestock.

Mineral deposits, including coal and oil, of incalculable value.

Over seventy-five percent of the big game and much of the small game remaining in the wild lands of the nation.

Some of the finest examples of American scenery and wilderness to be found in the continental United States, visited by over thirty million people annually.

Hundreds of mountain lakes and more than 100 thousand miles of fishing streams providing fishing and other forms of recreation for citizens from all parts of the country.

As producers of water, wood, forage, minerals and opportunities for recreation, these public lands increasingly have become interwoven into the social and economic life of the regions of which they are parts. Conservation and development of their productive wealth are essential to the maintenance and expansion of industry, agriculture, employment, health and happiness of the people of the regions they serve. This is especially true in the West where the bulk of the remaining public lands is located and blankets the headwaters of the major river systems. Today the West draws virtually all its water for municipal uses,

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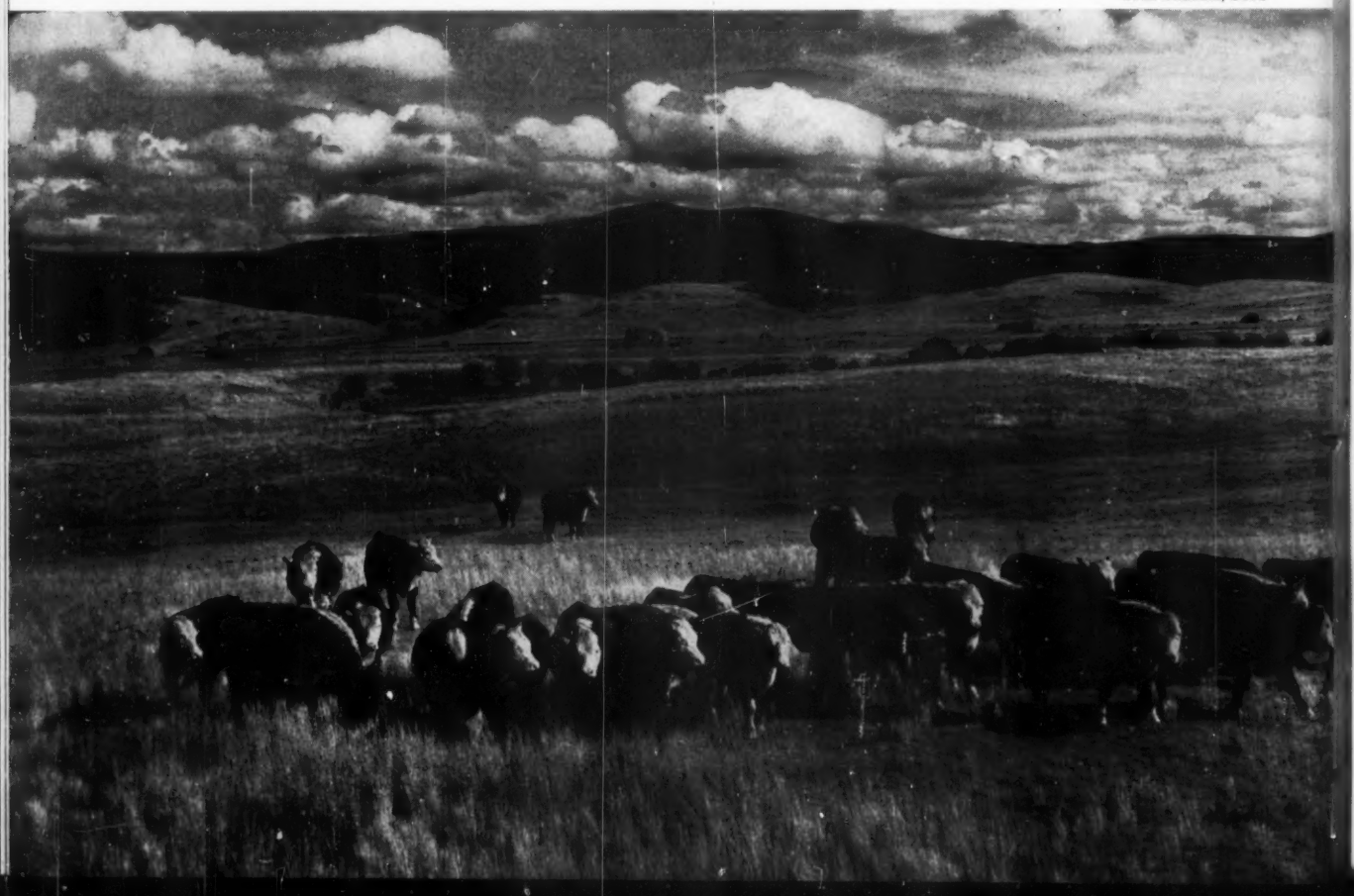
Of the 400,000,000 acres of public land now being managed by the government, 130,000,000 acres are devoted to grazing

F. E. Dunham, USFS



Italy Needs Trees

Here a distinguished legislator and conservationist, back from a tour of Italy, tells of that country's need for an extensive reforestation program

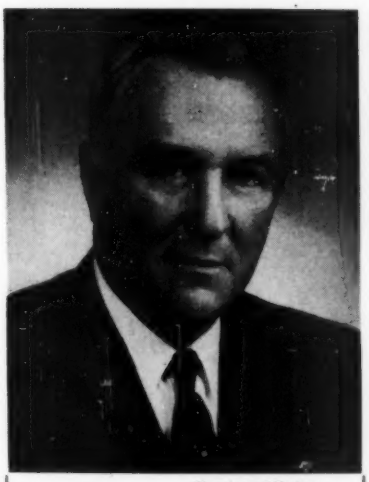
By REPRESENTATIVE JOHN McSWEENEY

DURING the last war, I served as chief welfare officer for all of Italy for the American Military Government and later was retained as foreign representative for American Relief for Italy, Inc., at the request of the Honorable Myron C. Taylor, the President's personal representative to the Holy See. My duties permitted me to travel extensively throughout that country and I witnessed firsthand the disastrous effects on the economy of Italy caused by lack of a reforestation program.

In 1928, as a member of Congress from the 16th District of Ohio, I introduced a bill, later known as the McSweeney-McNary Conservation Act of 1928, which called for an extensive forest survey. Conservation, and particularly reforestation, has been very close to me in a lifetime of public service. Thus, while in Italy, when I was asked to write an article on reforestation for the Italian press, I readily agreed. Since the thoughts expressed in that article are as timely today as they were then, I would like to quote liberally from it:

"I have been a teacher of ancient history in the high school of my home town of Wooster, Ohio. In reading and studying the history of the various countries which have held prominent places in the world annals, I can trace a more or less direct connection between their rise and decline in the use and misuse of their timber supply.

"The world—up until the eighteenth century—was operating in what we might call a wood economy. The trading and fighting vessels of the great mercantile and military nations of the past were made of wood. The cedars of Lebanon furnished the Phoenicians with timber for their great commercial and fishing fleets. The trees of the Appenines furnished the Romans their galleys. Spain maintained her world supremacy while she still had timber for her fleets.



Harris and Ewing

Representative John McSweeney, from Ohio's 16th Congressional District, developed an interest in Italy's forestry problems as an Army officer in 1945. More recently he has returned from a second look at that country's problems and this article is the result. Congressman McSweeney, a staunch friend of forestry, is the author of the McSweeney-McNary Law—a milestone in forestry history—that established an extensive forestry survey in this country.

"We even can trace a connection between China's famines and her timber supply. As forests were cut and not replanted, difficulties in maintaining her fleets and commerce mounted, while agriculture was affected at home. Mountain ranges became eroded. The old water-retaining forest floor was washed away, together with some of the substratas of rocks and other debris, all of which spread onto the arable land below, restricting the areas for cultivation. With rain and melting snow running rapidly off the land, the general water table eventually was lowered.

"The loss of timber, the curtailment of agriculture, the lessening of the water supply, plus the natural increase in population all led to a lowering of the standard of living and the accompanying loss of prestige and power.

"These conclusions with regard to the connections between agriculture and forestry and the general well being of a people led me, while a member of the Agricultural Committee of the United States House of Representatives, to devote most of my efforts towards forestry legislation, feeling that I was truly helping American agriculture fifty or one hundred years in the future.

"As chief of the welfare branch of the Allied Commission in Italy, and now as foreign representative of American Relief for Italy, Inc., my job has been to try to alleviate suffering caused by the war. Food and clothing, together with vitamins and medicines, have been generously provided. The pressing need for actual necessities of life has been too great to enable one to give much thought to future welfare planning. But it would be well to devote a little time to plans which will help the people of Italy not only to regain their former position among the nations of the world but, if possible, to improve that position.

"I read with great interest and profit the exhaustive and enlightening report of Nelson Brown, of the New York State College of Forestry at Syracuse (then chief of the Forestry Division of the Allied Commission at Rome), which not only presents a comprehensive history of forestry in Italy, but suggests helpful plans for the future. From this report it can be assumed that we are

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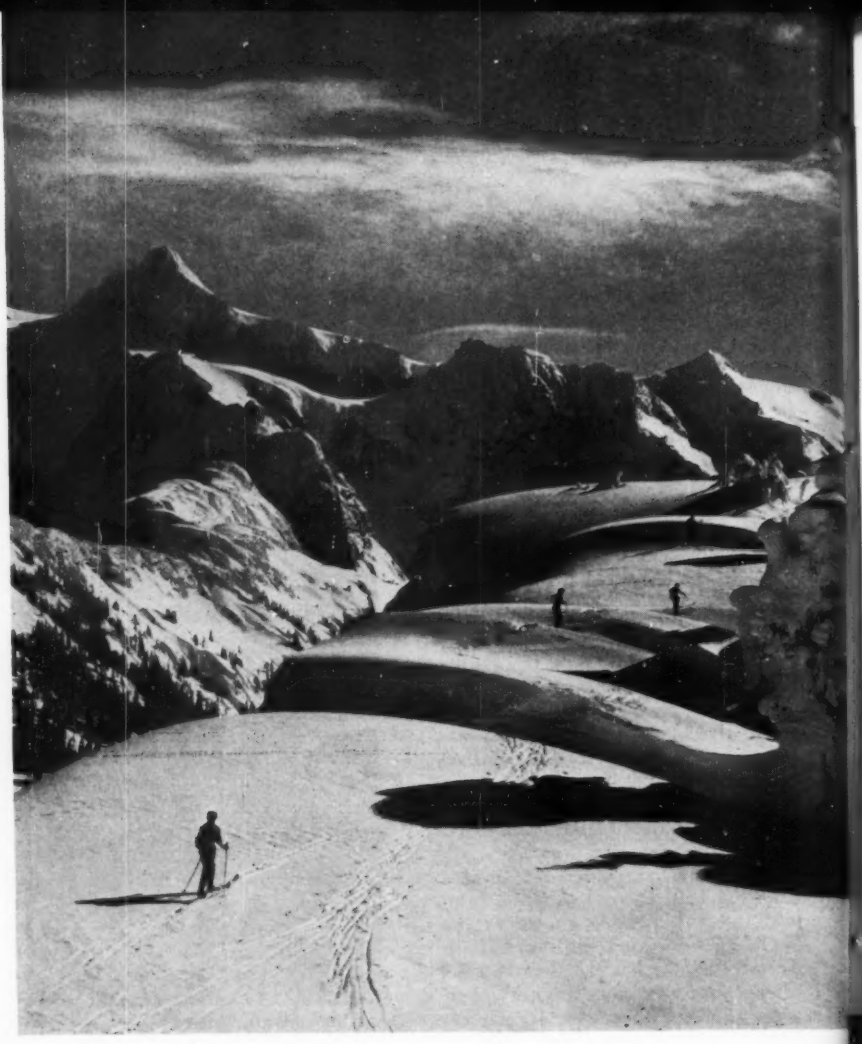
Hamstrung by bad weather, skiing slumped in the U.S.A. last winter.

But the enthusiasts, from seven to seventy, are more hopeful for 1950



Preview of 1950

Winter Sports

THE slap of skis skimming down snowy slopes and the buzz of ski tows—music to the ears of resort operators who groaned last season under a thirty percent slump in business due to perverse weather conditions—are expected to hit a new crescendo this winter *if* (and operators have developed a healthy respect for that little two-letter word) normal snow conditions prevail.

Snow conditions were definitely way out of kilter last winter. Mother Nature, who treated winter sports lovers so handsomely in 1947-48 when over three million visitors thronged the slopes, belted the operators with a wicked Sunday punch last year that left them reeling.

In the West, tows grumbled to a halt and the roaring fires died out in the lodge fireplaces when record-breaking blizzards put the blight on the entire season for many resorts. In the Northeast, on the other hand, such popular resorts as Tuckerman Ravine and Pinkham Notch experienced the most severe snow drought in years.

That it was the elements, not the enthusiasts, that caused the slump is definite. There has been no slacking off in the winter light-headedness that gripped the whole country right after the war, as far as skiing is concerned. In the West last winter, undaunted slope-bound skiers were snowed in and had to be dug out trying to reach their favorite hills. Loud groans were heard from eastern hickory addicts who surveyed snowless slopes with heavy disgust.

The enthusiasm is still there. Reports from ski clubs and resorts over the country reveal big plans for the 1949-50 season. Championship events already scheduled include: Four Event Championships, Mount Hood, Oregon, February 25-26; Downhill

Roller coaster wind drifts on Mt. Baker's Kulshan Ridge

Ray Atkeson

and Slalom Championships, Sun Valley, Idaho, March 25-26; Junior Downhill and Slalom Championships, Alta, Utah, March 18-19; Sun Valley Harriman Cup Races, March 4-5; and Douglas Smith Memorial International Downhill and Slalom Races, Whitefish, Montana, March 18-19.

What other developments are in prospect for the 1949-50 ski season? One new area is ready for use and another may be in the offing for hard-skiing Californians, John Sieker, chief of the Forest Service's Division of Recreation and Lands, reports. Squaw Valley in the Tahoe National Forest has a new 6100-foot double chair lift installed to alleviate crowded conditions at Donner Pass. A new lodge has also been readied for use at Squaw Lake.

Of special interest to Californians will be Mr. Sieker's announcement that proposals from prospective permittees for the development of the fabulous Mineral King area, potentially one of the finest skiing slopes in the world, are now being received by the Forest Service. Development of this great natural area would open up a new winter wonderland for millions of people located 250 miles away in Los Angeles and about the same distance in San Francisco. The Service will accept applications on this job until the last of February.

Sanders and Prater

Using a snowbank for a tablecloth, these picnickers in the Angeles National Forest munch their lunch in the shadow of the Mt. Waterman lift

Another new Forest Service development open this winter for the first time is Asten Basin, north of Santa Fe in New Mexico, where a new lift and lodge are ready for guests.

Weather permitting, the Forest Service this season expects that last year's total of 1,889,800 visitors to national forest ski resorts will start climbing back to the bumper season of 1947-48. National forest attendance last season was off thirty-one percent compared to the 1947-48 record of two and three quarter million guests.

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Sanders and Prater

Skiers waiting their turn on the tow at Vermont's Green Mountain Forest

A corner of Eden is this home of an ancient tree species high on the rugged wind-swept coast of California, just north of San Diego

Torrey Pine Park

By ARTHUR L. CENTER

MODERN road construction has eliminated many sharp turns and steep climbs to enable motorists to whip up and down four-lane ribbons of concrete at breakneck speed. What is gained in time, however, is often at the price of the tourist being deprived of scenic gems and centers of unique interest.

A perfect example of this is the Torrey Pines State Park in California. Rimming the ocean about fifteen miles north of San Diego and 100 miles south of Los Angeles, this unique and scenic area was formerly traversed by the north-south coastal highway. This particular stretch of road consisted mainly of blind curves and steep grades which required drivers to proceed at a slow pace, thus giving them the opportunity to observe at close range the rare and beautiful species of pine for which the park is named.

When the new highway was shifted inland to eliminate these hazardous curves and grades, the tourist was taken away from the crest of the mesa where these ancient perennials, exposed to the constant pounding of the strong ocean breeze, were easily recognized in their familiar twisted and distorted shapes. The old Torrey Pines Grade, as it is known, visible today in the fog and sunshine from the Del Mar approach, is still passable. But unless the motorist, especially the out-of-state tourist, riding over the new highway knows about it, the old road invariably is passed by. And so are the Torrey pines.

What makes this forest region so unique and attractive is that these botanical remnants of the Devonian Age have never been found growing elsewhere in the world, except on the Santa Rosa Islands, 100 miles out at sea. Known also as Soledad pine, Del Mar pine and lone pine, this rare tree is found only in open, scattered stands on the highlands adjacent to the sea and on the sides of deep ravines and washes leading to the coast.

The fact that it is known only on this narrow strip of mainland and on the Santa Rosa Islands has led to the theory that the shoreline at one time extended far out into the Pacific to these islands, and that vast forests of Torrey pine flourished up and down the coast from Santa Barbara to San Diego. Then, after a series of earth upheavals, as evident from the sedimentary soils in the region, most of the land vanished, destroying all forms of plant life.

Known to the Indians and early Spaniards, who camped within these boundaries, only as a good source of edible nuts, the botanical significance of the pine was not perceived until 1850, the year Dr. C. C. Parry, geologist and naturalist, identified it as an unknown conifera. He gave it the name of *Pinus torreyana* in honor of his old instructor and famous botanist, Dr. John Torrey of New York.

News of the discovery brought on an influx of vandalism by well-meaning citizens who only wanted to transplant the young trees or use the older wood for carpentry. The people of San Diego, however, recognizing the scientific importance of the trees, were prompted to proclaim some 1600 acres as a city park to prevent further destruction and possible extermination.

Today, thanks to such action, the reserve is included in the state park system of California.

Away from the sea winds, Torrey pine is a bushy, upright tree. The roots of this beautiful roadside specimen are protected by a huge concrete slab

Outdoor Photographers League Photo

Often mistaken for the lonely cypress of historic Monterey Peninsula, which they resemble somewhat, Torrey pines will grow, if properly cultivated, wherever there is a cold current and ocean mist. Farther inland, in favored localities, they have been grown as "Christmas trees." But only along the coast where they have been growing for centuries do they take on their peculiarly deformed characteristics.

Here, exposed to high winds, Torrey pine is a low, crooked, bent or sprawling tree from twenty-five to thirty-five feet high. Away from the sea winds, it will reach a height of from fifty to sixty feet, with a straight trunk as much as two and a half feet in diameter. The largest trees are found on sheltered sides of hills and spurs of canyons. They are easily distinguished from other pines of the Pacific Coast by their heavy needles, up to thirteen inches long, which occur in bundles of five. The foliage is dark gray-green and clustered in large tufts at the ends of stout branches.

The bark of young trees is spongy and dull gray. On the trunks of old trees it is deeply divided into broad, flat ridges covered with thin light reddish brown scales. A slow growing tree, it is also short-lived in comparison with other pines. Ages from 100 to 150 years are usual, with occasional trees rounding out 200 years.

Old and forsaken-looking, it is truly remarkable that they survive at all. From the time a pine cone, chocolate brown and from four to five inches long releases its seed, the long struggle under unfavorable conditions begins. The seed may be blown away by the wind before it has a chance to enroot itself, or it may fall on a spot lacking in moisture, or it may be gathered and eaten by man or animal. Indeed, the large seeds are much sought after—and are eaten either raw or roasted.

Yet, as if aided by some miracle, some of the seed do start life and after battling erosion, drought and the beating wind, surprisingly live out their life span. In their favor is the fact that an abundance of seed is produced every year, trees bearing well when from twelve to eighteen years old. Most of the seed is produced every year, trees during their third year. But from the presence of many bare spots within the park, it is evident that the fight for existence is rugged. In the reserve's 1600 acres the tree population numbers approximately 2000, which means slightly more than one tree an acre can make a go of it.

Outdoor Photographers League Photo

The twisted branches of the ancient pine support heavy chocolate brown cones, which produce large quantities of edible seed every third year

Perhaps it should be brought out that the light, soft, wide-grained wood of Torrey pine is of no commercial importance. This is due not only to its low strength properties but to its small size and its limited occurrence.

Also of interest are the stout twigs, which are bright green in their first season. With age they become light purple and eventually nearly black. The tree's blossoms, which may be seen anywhere from January to March, are intriguing. The yellow staminate flowers have short, dense heads; the pistillate flowers are purplish and borne on long, stout stems.

The cones, too, will warrant minute examination. Strongly attached to the branches by thick stems, they ripen in August of the third season, shedding some seed in September. They usually remain on the tree for four or five years, however.

Besides the beauty of the Torrey pine, the park is blessed with flora even more unusual. Though seldom noticed from the road, the area contains a variety of rare and colorful wildflowers. The traveler needs only to leave his car and follow one of the many trails to the top of the cliffs. An able-bodied person with a love of nature will find many things unbelievable for this locale.

Here along the sandy open trails sparse of pines are sand verbena, buttercups, lupine and larkspur. Nowhere else along the coast will you find the mountain sumac and the wild peony. Rare salvias, such as the Cleveland sage and the black sage, besides the more common blossoms of the prickly pear and the cholla cacti, are enough to make any stop worthwhile.

Atop the rim of the abrupt sandstone cliffs, carved into colorful patterns by wind, ocean spray and rain, can be seen the long endless shoreland to the south, while all around are small canyons with their hollowed walls sculptured into strange symmetrical designs by the destructive forces of erosion. The stillness of the spot is disturbed only by the humming of the strong seaward breezes and the waves splashing over the white sands 300 feet below.

From the top of this mesa, or along the beach reached from the north entrance, one of the most restful and memorable scenes is witnessed when the setting sun disappears below the vast Pacific horizon and the low sweeping fog moves in overhead, blending the yellows and the reds of the cliffs with the greens of the Torrey pines and the blue of the ocean into the dark gray of dusk.

Operation Gooseberry

For the first time a helicopter has been used to spray from the air in an attempt to control white pine blister rust. Here's how it worked

By H. R. OFFORD

ON June 23, 1948, a gray and yellow helicopter settled down on crescent-shaped Big Meadows in California. This event, in itself, was enough to cause a stir in this beautiful and remote stretch of grassland, the property of the Yosemite Mountain Ranch Club, flanked by the tree-covered slopes of the Sierra National Forest. Animals grazing on the meadows' gentle slopes did not take the instrusion placidly. Their reaction was immediate and violent.

Neither did the small band of men gathered in the meadows. The arrival of the helicopter also sent a shiver of excitement racing up and down their spines. But for a different reason. It meant that at long last the action phase of Operation Gooseberry was under way—that for the first time an attempt would be made to control white pine blister rust by killing wild currant and gooseberry bushes (*Ribes*), the host plants to this destructive disease, by spraying them from the air.

Where *Ribes* occur in large numbers, especially in remote and rugged country, the job of holding the blister rust fungus in check by digging out and destroying these plants is a time-consuming and costly undertaking. If some means could be found to eliminate high labor costs and at the same time speed up control measures on such areas in need of treatment, heavy losses in the valuable sugar and other white pine would diminish.

Technicians of the U. S. Bureau of Entomology and Plant Quarantine, with an eye on tests being made with aircraft, particularly the helicopter, in various other phases of forest protection, notably fire and insect control, began to see a ray of hope. If the helicopter, with its ability to operate at low speed close to the ground, could effectively spray the host plants with, say, the 2,4-D acid, without too great damage to associated vegetation, they might have the answer. The result of this thinking was Operation Gooseberry — and while it is too early to reach definite conclusions, there is evidence that the technicians are on the right track.

Before reviewing this evidence, however, let's see what happened at Big Meadows on that June morning of 1948.

When the helicopter was set down on the edge of the meadows, Pilot Harry Mitchell found not only personnel of the Bureau of Entomology and Plant Quarantine, and Helicopter Services of California, contractural parties for this pioneer test, but official observers from federal, state and private forestry groups. All were waiting for the answer to two questions: (1) could the helicopter maneuver close to the ground and spray effectively in the thin air at 6000 feet above sea level—and (2) would 2,4-D sprays, broadcast onto the forest from the aircraft, kill *Ribes* without damaging the conifers?

Command post, complete with field radio, was set up under a large cedar tree. Not far away two men mixed the spray while the dual seventeen-foot blades of the helicopter swished softly as the warmed-up motor idled. Finally the spray was

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The helicopter starts its spray run, loaded with twenty gallons of 2,4-D. The plot is a narrow draw containing black oak, willow, alder—and *Ribes*

H. R. Offord

MASONITE *in Australia*

By H. BOWDEN FLETCHER

A portable field camp used to house Masonite employees working in the forests. Sleeping quarters, mess hall, cook's galley and shower room are built of bolted sections and can be moved on short notice by motor trucks

Future fiber board. Dense stand of eucalyptus, the result of natural seeding, before thinning by Masonite foresters

After thinning. The final tree crop, under the Masonite plan, will average 150 trees to the acre

ONE of the major problems facing executives, when establishing a new industry, is that of assuring continuity in the supply of essential raw materials, and in this connection the Masonite Corporation of Australia has found it necessary to prepare a long-term plan for the future of its timber resources.

In these days of manpower shortage, the difficulty of securing new machinery and plant, together with heavy demands on local timber supplies for the urgent housing problem, it was necessary for the technical staff of the corporation to approach the long-term problem with vision and imagination, coupled with technical skill of a high order.

It was realized at the outset that the old order of haphazard handling of forests was over.

For the Masonite Corporation, timber is the vital factor in the future growth and usefulness of the organization. Therefore, rather unusual efforts, for Australia, have been taken to insure that the plant at Raymond Terrace, in New South Wales, will have an ample and permanent supply. The program, in course of implementation, is considered to be unique in this country.

The timberlands controlled by the corporation embrace about 50,000 acres, mostly of second-class terrace and foothill lands extending from Raymond Terrace in a northeasterly direction toward Stroud and the Myall River. Insufficient in themselves to provide the full future requirements of the plant, additional areas will be added as they become available for either purchase or lease. Strangely enough, the bulk of the 50,000 acres is held under Freehold title by individuals and not by the corporation. With them the corporation has entered into an interesting agreement, on a long-term basis, which provides for the management, by the corporation, of the timber, its protection and harvesting while reserving to the owner of the land the grazing and other rights.

The basis of the corporation plan is the principle of sustained yield by means of a regular rotation of forest crops. The organization aims to have an area ready for cutting every year and, what is more important, once an area is cut immediate action will be taken to restore it.

The New South Wales Forestry Commission has devoted years to the study of silvicultural treatment of indigenous hardwoods and the information in its possession has been made available to the corporation. But there is still much to be learned, particularly on plans necessary to provide supplies for industrial needs.

However, information available gives a fair indication of what should be considered a reasonable period for rotation and the volume that can be anticipated from the final crop. To add to the existing store of knowledge, a number of sample plots have been established.

The plan being implemented by the corporation is confined to the development of native hardwoods and with regeneration through seed and coppice rather than by planting. The country being dealt with covers a wide range of soils including coastal sands, fertile creek and river flats, poor clay and eroded sandstone ridges. In consequence, the timber growing includes an exceptionally wide range of species. Some fifteen to twenty varieties of the eucalypt are commonly found. But as the Masonite process is versatile, and can cope with this unusual range, it is intended to concentrate on the development of the species which are found growing naturally in each area.

For easy handling, the forest areas are divided into three working cycles on each of which a program of development is being pushed under three separate headings: (1) permanent improvements such as roads and camps; (2) silvicultural treatment; and (3) fire protection and prevention.

The forests controlled by Masonite are located in comparatively small blocks scattered over a wide area. This naturally involves the movement of working gangs from one area to another at fairly frequent intervals. To assist this movement considerable attention has been given to the construction of portable camps of a standard design.

The type now generally in use comprises a mess hall, galley, shower block, storeroom and other essential units made from bolted sections which

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A continuing timber supply is essential if a new wood-using industry is to prosper Down Under. Here is how the Masonite Corporation of Australia is laying plans for sustained yield

"IPPI" Makes Good

By A. J. BROWN

Education by demonstration is one "IPPI" weapon against improper cutting practices. Don Young of the Texas Forest Service addressed this gathering

Better forestry practices in Texas is the goal of Independent Pulpwood Producers, Inc.

"WE will end up cutting our own throats," said C. F. Hilton one spring day in 1947, "if we keep on cutting like this." He made a broad gesture to include all the landscape before him. Reagan Smith, sitting on a stump in an east Texas field—where little but stumps were left—said nothing.

Hilton and Smith were pulpwood contractors. It was their job to see that the hungry mills of the Champion Paper and Fibre Company at Pasadena, Texas, were fed pulpwood in unending quantities. They were but two of a large group whose livelihood depended upon the constant supply of trees suitable for the maws of this huge, sprawling plant which makes, among other things, the paper stock for such magazines as *Life* and *Fortune*.

Bruce F. Stewart, general manager of "IPPI," has a missionary's zeal

They had a problem; and the immediate landscape before them typified that problem. It was a plot that had recently been cut for pulpwood —a graphic example of how *not* to cut woodland. Everything of value had been stripped from the land. Clear cutting such as this might have had justification generations ago when land was being cleared for farming. But this was not generations ago and the land was not especially suited for farming. It was fundamentally timberland. As it stood, pulpwood men would probably not harvest it again in a lifetime. It was one of those jobs somehow reminiscent of a Kansas field where grasshoppers had stalked through, leaving little but desolation behind.

Bad cutting practices, very pronounced during the war, were continued as late as 1947. Some localized areas were being depleted at such an alarming rate that, more and more, there was talk of federal regulation of cutting. Producers of pulpwood realized that such clear cutting was wrong, but what could *one* man do about it? Or two men? Competition was keen. Owners of small timber tracts took bids for their pulpwood—and sold in the manner they thought best. And they were more prone to look to the immediate cash prospect than to the future. If one buyer made an offer based on selective cutting, another would follow with a bid based on mining the pulpwood from the land. The latter was more often the successful bidder.

"There ought to be a law against it," said Reagan Smith, who hails from Conroe, gesturing toward the bare stumps. Yet he knew that another law was not the solution.

Texans are by nature individualists. They have an inborn distaste for regulation—unless they themselves are the regulators. They have a tradition that they should be their own dispensers of right and wrong wherever it is possible. Hilton and Smith felt, too, that the educational process had not been given a fair trial.

So they talked it over with other producers, swapped ideas, made up their minds and then organized the Independent Pulpwood Producers, Inc. Thus "IPPI," as it has come to be known, was born.

Under the leadership of Hilton, whose home is in Jasper, there was devised a charter and by-laws. These were submitted to the state attorney general's office, and the charter was granted in January of 1948. The first director's meeting was held in February of that year. Hilton was elected president, Reagan Smith vice-president, and J. F. McAdams of Cleveland, secretary-treasurer.

The board of directors is made up of independent contractors.

It is a non-profit corporation. No capital stock has been issued. The organization is financed solely by voluntary contributions by contractor members of a minimum of five cents a unit on all pulpwood shipped. This figure can be raised if deemed advisable by the board of directors. During 1948, the amount contributed in this manner totaled nearly $10,000.

The initial and chief aim of the organization is to curb clear cutting and substitute some form of partial cutting. Two methods are being employed to achieve this goal: (1) voluntary application of sound forest practices by contractor members; (2) an educational program to convince forest landowners and operators that sound cutting practices and proper management will pay off.

The Champion Paper and Fibre Company not only gave "IPPI" its blessing, but offered financial assistance as well—and without any attempt to influence the actions or policies of its membership.

The program is basically educational. And since the directors were quick to realize that what is everybody's business is nobody's business, it was decided to select a well-qualified man to direct the project. That is where Bruce Stewart comes into the picture.

A native Texan, Stewart is a technical forester, a graduate of the University of Georgia. His background includes one year as forester for a large lumber producer in Texas, two years as district forester for the Texas Forest Service, and five years in the Army during World War II. Over the door of his office in Cleveland the shingle reads "General Manager," but don't look for him there. His work is in the field, with landowners and pulpwood operators—and that's where you're most likely to find him.

Imbued with the fire and zeal of a missionary, Stewart tramps the woodlands preaching the gospel of forestry. He has become personally acquainted with virtually all producers and sub-contractors who put out wood for contractor members. To each the program is explained, support enlisted. And results have been gratifying. Landowners are given free technical advice on cutting and management practices; trees are marked for cutting when the owner so desires. Real progress has been made.

An example of the organization's work was a timber-harvesting demonstration a stone's throw from the sawmill of the Foster Lumber Company at Fostoria. A four-acre plot was set aside by the company for this purpose. Four half-acre tracts were plotted out and different types of cutting demonstrated. Stewart and Don Young of the Texas Forest Service, went on the land in advance, cutting for sawtimber, ties, poles, pulpwood and fuel. Careful tabulation was made to show the returns on each type of cutting and to explain the proper method of handling the land. In September of 1948, a group of 125 persons went through this "short course." The personnel of the group represented two and a half million acres.

The Foster Lumber Company later deeded the tract to "IPPI" at a nominal price. It will be used as a laboratory for further study. Growth and reproduction data and information on future cutting will be kept by Stewart with the help of the Texas Forest Service.

C. Y. Townley, manager of the wood procurement department, Houston Division, Champion Paper and Fibre Company, favors "IPPI" because it "is helping to get the word to more landowners—and the landowner is the boy we need to convince that partially cutting his timber instead of clear cutting means more dollars to him."

Lee Henry, a pulpwood producer at Kirbyville, has this to say: "Pulpwood is a business with me, and I think it's to my best interests to cut timber right. That way, I feel, I'm making satisfied customers of the owners and can do business with them again and again over a period of years. 'IPPI' is honestly trying to help and teach the timberland owner, and I'm going to keep on working with them."

It seems plausible to predict that "IPPI," though still a little fellow, armed chiefly with the sling-shot of education and persuasion, may prove to be a David who will knock sprawling the giant of improper woods cutting in the pulpwood sector.

Lured by a good old-fashioned noon barbecue, woodland owners spend a whole day at one of "IPPI's" forestry demonstrations. This kind of education pays

Chicago Natural History Museum

A botanical masterpiece—the Chicago Natural History Museum's diorama of springtime in an Illinois woodland. How many different trees and flowers can you pick out?

Museum of Trees

By BOB FORBES

ONLY a few minutes' walk from the heart of the nation's second largest city, the Chicago Museum of Natural History is fast becoming something of a mecca for tree lovers and students. The gift of the late Marshall Field, it presents the essentials of tree study in a manner not duplicated by any other museum in the world. Here one can observe the botanical features of trees, study their systematic classification, and become familiar with their wood and other products.

All exhibition halls devoted to botany place emphasis upon individual trees and groups of trees. Two of these—the Hall of North American Woods and the Hall of Foreign Woods—deal with trees and woods exclusively.

In the Hall of North American Woods are forty-four exhibition cases, each containing one or more important domestic trees, primarily American timber species. Each is represented by photographs of the living tree, in summer and in winter, and a fruiting or flowering branch in leaf, along with a map showing its range. Numerous cases present full-scale models of branches.

There is also a five-foot section of the trunk of each species. This upright log, and a cross section from it, is presented with the bark intact and as natural as conditions permit. Each species is represented by one or more boards, both quarter-sawn and flat-sawn lumber.

Timbers native to the rest of the world, many of which find their way to our markets as costly veneers, are displayed in the Hall of Foreign Woods. Each board is exhibited in a natural condition, although some fine cabinet woods are given a polished finish. Notable in this connection are plywood panels of burl-grain, such as those of English yew, Italian olive and Carpathian elm.

Another case compares the relative weights of extremes among foreign woods. In an impressive manner, a three-inch cube of Lorento redquebracho is compared with an adjacent block of West Indies balsa, one foot square and three inches thick. A placard with the blocks states that both have an equal weight.

In the Hall of Food Plants and Palms are displayed botanical features of the palms of the world, as well as examples of innumerable ways in which they enter tropical economy. The raffia-palm of Madagascar, carnauba-palm of Brazil, betel-nut-palm of tropical Asia, Cuban royal palm, the cabbage palm of the southern United States and many others emphasize the variety and importance of these plants.

To produce satisfactory displays of plants for the museum, special expeditions are made to obtain material for the models, and often much preparation is done in the field with living specimens at hand. The models may incorporate parts of the natural plant and those fabricated in the museum laboratories. Thus, the trunk or branches and other durable parts of a tree may be combined with modeled leaves, fruits and flowers, skillfully made in celluloid and other plastics, glass, wax, metal and fiber.

So realistic are the plant models that many museum visitors have difficulty believing what they see is not the product of nature.

Tree products other than timber have been assembled in the Hall of Plant Raw Materials and Products. Among these are wood pulp, turpentine, rubber, tannins, dyes, vegetable oils, lacquer, cork, resins and essential oils.

Ten trunks cut from mature trees each bear incisions in the accepted manner to obtain a maximum of latex or resins. Four are trunks of Latin American latex-bearing trees—two of the Para rubber tree, one each of the Panama gum tree and Guatemala "cow" tree. Several trunks portray features of longleaf pine turpentining in the southern United States, while one trunk exhibits the method of tapping Scotch pine for turpentine resin in Russia.

The Hall of Plant Families contains at least one case for each of fifty tree families of world importance, as well as exhibits devoted to strictly herbaceous and shrubby groups. For example, the legumes, or pea family, occupy four cases because of the diversity and number of their kind. The smaller rose family is allotted two cases in which are displayed reconstructed fruiting branches of plum, loquat, cherry, pear, apple and a European rose, as well as a colorful blossoming branch of native crabapple. Timbers of the two families are not forgotten, although receiving more individual attention in the wood halls. Small plaques of a few woods are included to represent the timber importance of each family.

Large dioramas depicting different plant associations are the museum's botanical masterpieces. Trees play a major role in one of these, and a strictly incidental part in another. In the springtime Illinois woodland scene, four different trees form the canopy under which a multitude of shade-loving herbs display their venal blossoms. The barely opened leaves of American linden, white ash, sugar maple and white oak are seen to form an upper layer in the woods, while the new bursted buds of tree seedlings and redosier dogwood, black cherry and common witchhazel make a lower tier.

A profusion of herbs, such as spotted geranium, snow trillium, American columbine and three-color phases of the common violet, make up the lowest layer. Spring is exemplified on all sides not only by the abundance of flowers and unexpanded leaves, but by the latter's color as well. New leaves of oak and Virginia creeper show a liberal sprinkling of the red coloring apparent before the green chlorophyll has reached its summer peak. Buttercups find

The artistry of the museum's staff is at its best in this full-scale model of a flowering branch from a tuliptree

a favorable damp environment beside the streamlet fed by melting snow.

A second diorama depicts the rocky flanks of a peak near the roof of the North American continent. Two trees sprawl among the early summer flowers at an elevation of 12,000 feet in the Medicine Bow Mountains of Wyoming. Dwarfed spruce and juniper are shown above a carpet of moss and brilliantly flowering herbs.

A major share of the credit for this exhaustive display of the plant kingdom and its products goes to Dr. B. E. Dahlgren, chief curator of botany at the museum. For over forty years he has worked to bring the exhibits to their present excellence by careful administration, research and collection. The palms, in particular, should be considered his personal memorial, although he has had an active part in the entire botany exhibition. They represent years of painstaking work and many expeditions to the tropics.

The museum features elaborate exhibits in its Hall of North American Woods. This pignut hickory display is an example

KNOWING YOUR TREES

LAUREL OAK

Quercus laurifolia, Michaux

By WARREN D. BRUSH

NAMED for its lustrous leaves, which resemble those of the laurel, this large and stately tree is found in the Atlantic and Gulf coastal plain regions from North Carolina to Florida and westward to Louisiana. It prefers wet localities, occurring largely along the margins of streams and swamps in association with water tupelo, Atlantic whitecedar, baldcypress and sweetbay. Nowhere abundant, it usually occurs as a scattered tree but is quite common in eastern Florida where it attains its largest size. When grown among other trees in favorable localities, laurel oak may reach a height of 100 feet with a straight, columnar trunk three to four feet in diameter; it is usually much smaller, however. The trunk is tall with comparatively slender branches which spread gradually into a broad, dense, round-topped symmetrical head.

Except for its wider leaves and deeper cup in which the acorn is held, it resembles willow oak (*Q. phellos*) closely. The smooth, slender branchlets are dark red when they first appear and dark red-brown during their first winter, becoming reddish brown or dark gray in their second season. The winter buds, about one-eighth of an inch long, are ovoid or oval, abruptly narrowed and acute at the apex and are covered with numerous thin, closely overlapping bright red-brown scales, the margins of which are fringed with hairs.

The elliptical to oblong egg-shaped leaves, two and a half to four inches long and one-half to an inch wide, usually have smooth margins but are sometimes irregularly lobed. They are wedge-shaped at the base and pointed at the apex. At maturity they are thin, dark green and smooth above, paler beneath, with a conspicuous, raised yellow midrib. Each leaf is borne on a short, stout, yellow stalk.

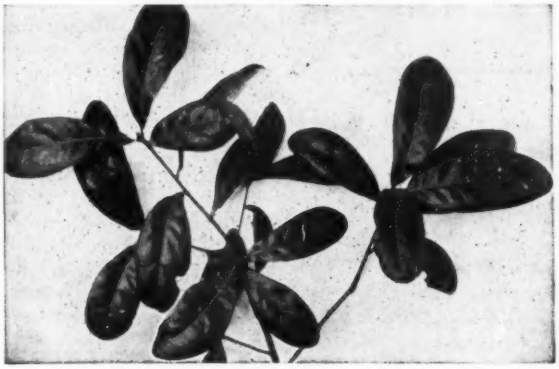
Laurel oak is semi-evergreen, the leaves remaining on the tree during the winter and falling in early spring. The branches are partly bare for only a few weeks before new leaves develop.

Generally in March or April, when the leaves are about one-third unfolded, the pollen-bearing flowers appear in clustered, red-stemmed, hairy catkins from two to three inches long. The acorn-producing flowers are borne on short, stout, smooth stalks.

Ripening in the autumn of the second year, the stalkless or extremely short-stalked acorns occur singly. The

Chicago Natural History Museum

Though a large and stately tree, Laurel Oak has slender branches which spread gradually into a broad, dense, symmetrical crown. Under favorable conditions it may attain a height of 100 feet



L. W. Brownell

Oblong leaves, wedge-shaped at the base and pointed at the apex, usually have smooth margins

L. W. Brownell

Enclosed in a thin cup, the dark brown or nearly black egg-shaped acorn is about one-half inch long

dark brown or nearly black nut, about half an inch long, is egg-shaped to hemispherical, hairy at the rounded apex. It is enclosed for one-fourth or less of its length in a thin, saucer-shaped cup. This has fine, silky, red-brown hairs on the inner surface and is covered by thin, ovate, closely overlapping, light red-brown scales which are pale except on their darker colored margins. A large crop of acorns is usually produced every year.

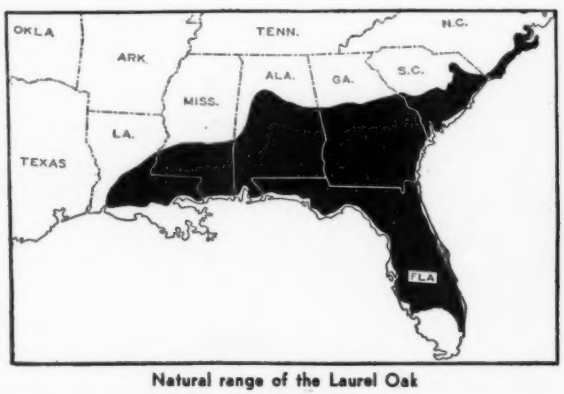
The bark on the trunks of young trees is dark brown, more or less tinged with red and from one-half to one inch thick; it is roughened by small, closely-appressed scales. On old trunks the bark is from one to two inches thick, nearly black, and divided by deep fissures into broad flat ridges.

The wood is heavy, hard, strong, coarse-grained and liable to check badly in drying. The heartwood is dark reddish brown with thick, lighter colored sapwood. Laurel oak is not used commercially to any great extent, its chief use being for fuel. One of the less important members of the red oak group, the total standing timber is estimated at about 2,000,000,000 board feet, which is only four percent of the total for all the red oaks.

Because of the attractive form of the tree and its nearly evergreen leaves, laurel oak has been widely used, especially in the South, as an ornamental, particularly as a shade or street tree, for which it is well adapted. It is, however, shorter-lived than its associate, the willow oak, and is considered by some to be less desirable for planting than either water oak or willow oak.

L. W. Brownell

Pollen-bearing flowers appear in clustered, red-stemmed, hairy catkins, and are two to three inches long



Natural range of the Laurel Oak

L. W. Brownell

Bark on old trunks is nearly black, deeply fissured

Adventuring in Trees and Grass

Do you own a farm—with woodland? Or do you dream of owning one some day? In either case, this narrative, in six parts, by Mr. McKnight, a businessman turned farmer, will have appeal. For he will share, step by step, his experiences in restoring 186 acres of meadows, pastures and woodlands that have been farmed since the days of George Washington.

By HENRY T. McKNIGHT

THOREAU recalls to us that "we are wont to forget that the sun looks down on our cultivated fields and on the prairies and forests without distinction. They all reflect and absorb his rays alike."

At Cornwell Farm, in Fairfax County, Virginia, just up the Potomac from Washington, D. C., we are taking Thoreau's reminder into account. We are working and improving our meadows, pastures and woodlands toward a goal of high production in two major crops, grass and trees. We are trying to match nature's impartiality between field and forest by looking at Cornwell as a close-knit integrated unit to be farmed for grass in summer and trees in winter.

We are apprentice farmers, having recently acquired Cornwell, a handsome, high-lying old place whose 186 acres have been farmed since the days of George Washington. But we are enthusiastic. And we are doing only what any landowner with a modest budget can do merely by taking advantage of the technical know-how available to him — and at a considerable expenditure of hard work, of course.

Like many an old farm, Cornwell now shows the warning signals of too much use. Gullies cut across its corned-out fields. Much of its woods, heavily timbered some forty years ago, are now almost buried in honeysuckle. Its porous barn and outbuildings have long outlived their usefulness. Yet, Cornwell Farm is still beautiful.

When we acquired the property last winter, we looked out across thick broom sedge billowing across the permanent pasture and rank weed growth in almost complete control of some of the other fields. The rusty fence-lines could hardly turn a man's shadow, let alone cattle. Out in the woodlot a large chunk of missing trees showed that a dutiful hired man had methodically torn away part of the forest for firewood. In short, the first survey of Cornwell Farm indicated that a large number of projects were in order before the farm could be enjoyed or made to pay.

An uncle, a member of Congress, had given us this tip: "First, pay your respects to your county agent and ask for his advice. Then go right down the line on what he tells you."

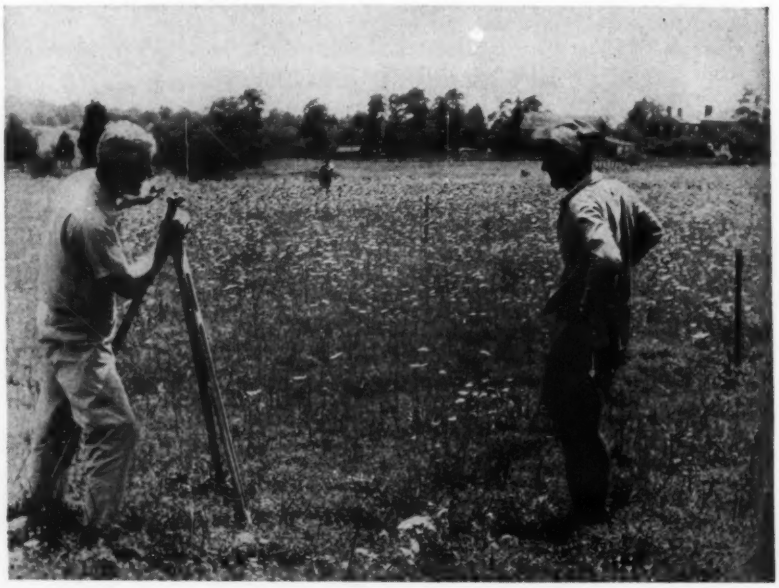
Based on his experience in the area, Joe Beard, Fairfax county agent, was quick to come forward with an overall plan. And the plan was as large as was our dream for future Cornwell perfection.

There was no budget for improving the fields and woods all at once. Bringing the place back to top fertility and top production would be a long-range operation into which would go all the research and assistance the various and expert government agencies could provide, plus our own time, effort and money.

The first consideration was the soil. The auger of Harry Parks, district soil conservation officer, showed a serious lime deficiency. At the same time, a study of the land capability map provided by his office indicated how suitable this acreage would be for grassland farming. Much of its hilly land is too steep for cultivation. Where it is gullied (and this means to a greater or less degree in every field), nothing but good grass can save the land.

In general, Mr. Parks found that the soil would respond to treatment. His prescribed practice was the development of a fertilized and managed grass-clover sod for a grass-cattle conservation type of farming operation. The thirty-seven-acre permanent pasture, with its eyesore of broom sedge, brambles and weed cedars, was clearly the field most in

The author (right) and Harry Parks, district soil conservation officer, plan a diversion terrace. Historic Cornwell is shown in background.



need of improvement. It was a winter's work to de-cedar and de-bramble it, but by late March it was limed, disked and fertilized with 0-12-12. It was then seeded broadcast to fourteen pounds of orchard grass and twenty pounds of lespedeza an acre.

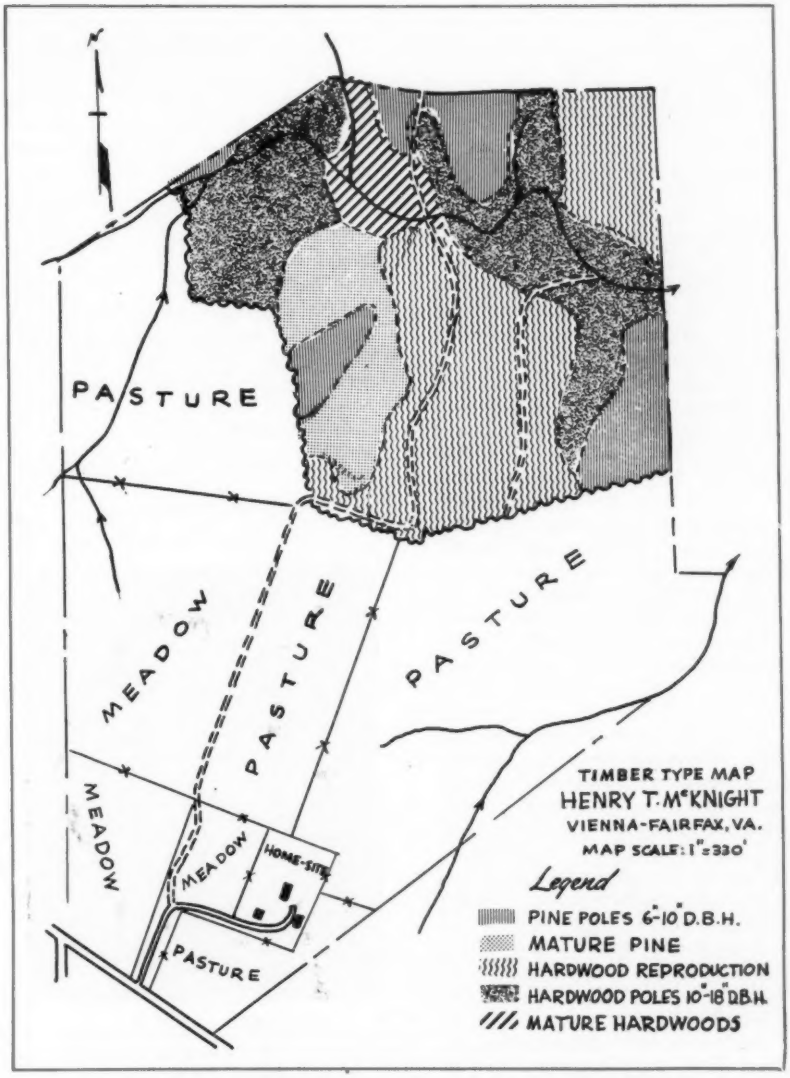
As an experiment, we walked through the woods with the land capability map before us. We found that, wherever the map indicated fertile land in the fields, the same land as it stretched into the woods produced a high grade of hardwood. By the same token, a rocky stretch of land in the permanent pasture could produce no better than cedar and scrub pine where it overlapped into the woodland. District Forester Marcel Pfalzgraf, of the Virginia Forest Service, later cruised the entire eighty-acre woodland to determine the present inventory and to make recommendations for our future forestry practices.

As a result of this study, we plan to (1) clear cut the mature pine in an eighteen-acre area heavily infested with honeysuckle; (2) gradually improve the twenty-four-acre hardwood reproduction area, perhaps at the rate of five acres a year; (3) market some of the mature hardwoods each year; and (4) set up our woodlands as a tree farm to furnish Cornwell with its required wood products and to furnish us with a steady income from the sale of desirable timber — always keeping in mind the improvement of the forest for future benefit.

At the outset, it was our policy to be long on grass and short on cattle, and we took refuge behind this policy while friends argued the merits of Hereford, Shorthorn and Angus as our selection of a beef herd. What finally sold us on Angus was that there are more of them in our neighborhood, thereby insuring a readier and steadier market.

As our first summer progressed and we watched the first few cows fatten on the new grass, we began to think in terms of an eventual forty-cow herd. This figure put size on the new barn we would be needing, which in turn gave us an estimate of the amount of mature pine we would have to cut from the tree farm.

By July the permanent pasture was luxuriant in its new crop of orchard grass and lespedeza. Then we knew that grass was our crop. And like all beginners who think they find early success, we began experimenting a bit over our heads. Near as we are to Washington, we get more than our share of free advice, the best of



The relation of woodland to meadows and pastures is shown in this timber type map. The 80-acre woodland will be operated as a tree farm

which came from a Kentucky congressman. He interested us in Kentucky fescue 31. Congress was in session all through the summer, and on many a warm evening various Washington dignitaries could be observed upended in the old hog lot searching out the elusive strain. Early this fall we put another fifteen acres to a mixture of Kentucky fescue and Ladino clover, and already we feel confident that fescue will become an important part of our managed grassland program.

Thoughts of early success breed impatience. So we began thinking in terms of stepped-up pasture improvement at the low-cost figures we could afford. As "book farmers," our textbook reading led us to Professor Carl B. Bender's six-plot pasture system which we are gradually adopting to put all of our pastures on a rotational basis. Kent Leavitt, president of the American Association of Soil Conservation Districts, and a director of The American Forestry Association, got us started with a complete conservation plan to help us achieve our production goals more completely.

So during our first fall at Cornwell Farm we were launched on a number of projects to bring our new place back to top fertility and productivity. In future issues of AMERICAN FORESTS we shall trace the development of the complete conservation plan, the tree farm, the grassland experiments and all other projects which we believe will bring out the natural affinity between grass and tree farming.

Dams Are Not Enough

(*From page 9*)

drier western states that this subject is receiving increasing attention from harassed engineers and land managers. Water will simply not be available, at the present rate of watershed despoliation, to compensate for excessive losses, by siltation and evaporation, in storage capacity. And we cannot continue indefinitely to find a new reservoir site for every one that becomes useless.

The truth is that many of the multiple-purpose structures, built at great public cost, are eventually doomed to failure. Many of them will stand some day as gigantic useless monoliths symbolizing the incredible faith of men in an engineering approach to our water problems—while at the same time the watershed itself is being progressively destroyed by the wanton use of the plow, the tractor, bulldozer, ax and the hoofs of grazing animals.

IV

An aspect of reservoir construction often minimized by its planners is the resulting displacement of people dwelling in the usurped areas. Fair payment by the government for land that is flooded, or otherwise rendered commercially useless, by no means compensates for economic adjustments which people must make in finding new places to live and work, nor for the destruction of family ties and sundering of communal institutions.

The largest mass displacement resulting from watershed development has occurred in the Tennessee Valley. By June 1946, TVA had removed 13,449 families from sixteen reservoir areas, with about 1000 families still to be evacuated. The sum total of persons involved was probably around 70,000, almost two thirds of whom were tenants and one third landowners.

Despite the general solicitude shown by the Authority, this exodus, carried on over a period of thirteen years, necessarily produced a social revolution. Specific facts are not easily available, and the Authority itself has not yet studied the human by-products of its far-flung construction operations. "In general," says Donald Davidson in his book, *The Tennessee: From Civil War to TVA*, "probably half the displaced persons were ready to make an adventure of it, and were content; out of the remaining fifty percent at least half were easily persuadable. . .The worst tragedy of the removal was in the fate of the older folk. They were genuinely reluctant to let the waters take the acres where they had spent their lives. They could not bear to think of living elsewhere. For many of these death was hastened by the removal."

TVA tried to avoid ruckuses. It catered to people's sentiments. For example, it arranged for the relocation of old cemeteries, traced down relatives, provided new burial sites, bought new caskets, and arranged for re-interment ceremonies—even paying the preachers' fees.

But TVA was not legally empowered to provide new farms for tenants or farm laborers, nor homes for the homeless. It could not preserve picturesque river villages or crossroads settlements, nor safeguard spots rich in local history or folklore. Many of these were effaced, even as thousands of people were set afoot to find new homes and new friends, and gather up the severed threads of an existence that had changed but little since their ancestors had moved into the heavily-timbered bottoms and isolated mountain coves a century and a half before. This was one of the inevitable costs of river improvement.

V

An important aspect of dam construction is the toll it takes of unique scenic, historic, and recreational areas. Many an idyllic valley, rare patch of primeval woodland, unusual rock formation, and thrilling canyon and gorge have been sacrificed to provide reservoir areas. But such damage has hardly begun. Unquestionably, if most of the projects now under discussion by ambitious federal agencies get beyond the drawing board stage, many of our natural recreational and wildlife areas will be in danger of serious encroachment or ruin.

Typical of this menace is the Bureau of Reclamation's plan to dam the Colorado River at Bridge Canyon to form a reservoir that will supplement the power facilities of Hoover Dam, provide irrigation water for central Arizona, and retard (temporarily) the alarming flow of silt into Lake Mead. The reservoir would extend upriver the full length of Grand Canyon National Monument and eighteen miles into the national park. At high water levels it would be a rather impressive artificial lake, but at low water levels, according to Frederick Law Olmstead, the noted park planner, it would be "a colossal and more obviously artificial mess of mud and miscellaneous debris." While the total damage would not be great, the building of Bridge Canyon Dam might well open the door to widespread encroachment upon national parks or monuments that were expressly set aside for their scenic values and removed from economic exploitation. Furthermore, serious question has been raised about the economic benefits of this costly proposal.

What little is left of the original natural environment in the United States is precious to millions of people—particularly those penned up in cities—because it offers an avenue of escape from an excessively gregarious, nerve-wracking and mechanized existence. But water development planners tend to ignore the need for esthetic stimulation, healthy outdoor recreation, or communion, in the Wordsworthian sense, with rocks

(*Turn to page 42*)

My Favorite Tree

Norman Rockwell
Famous American Artist

My favorite tree is the sugar maple. Our home is surrounded with them and our next-door neighbor makes syrup from them. This process interests my family very much and provides us with a lot of fun.

Jaycees Launch Tree Planting Project

That those energetic Jaycees have vision as well as vitality is evinced in their proposed coalition of rural and urban youth to plant ten million seedlings in 1950

AN IDEA developed by two young Virginians, a lawyer and a forester, to form a tree-planting coalition between young businessmen and young farmers, has been adopted by the National Junior Chamber of Commerce as an action program and may provide the impetus for the planting of ten million seedlings.

Revenue from gumball machines distributed in their city enabled the members of the Norfolk, Virginia, Jaycees to set the program in motion with the purchase of 50,000 seedlings. Quota for all thirty-two Jaycee groups in the state is now 400 thousand.

The project gained new momentum in November when Georgia Jaycees ordered 1,500,000 pine seedlings to give to 286 Future Farmer of America organizations in that state. Jaycee clubs in thirty-eight Georgia cities are cooperating to buy a minimum of 5,000 seedlings for each of the state's FFA chapters.

Jaycee groups in other states are rapidly rallying to the call for tree-planting action sent out from national Jaycee headquarters in Tulsa, Oklahoma, by Robert Hoskins, vice-chairman of the Junior Chamber Agricultural Committee. Arkansas recently climbed aboard the tree-planting bandwagon. North Carolina has approved the plan. Florida is planning to. Action is brewing in other states.

How the "Norfolk Plan" became the "Virginia Plan" and finally the national Jaycee Tree Planting Program is due in large measure to the initiative of L. S. Parsons, Jr., Norfolk attorney and president of the Norfolk Jaycees in 1948, and Hoskins, who is also forester for the Seaboard Air Line Railroad.

With young farmers well represented in the Norfolk chapter it was inevitable that talk eventually swing around to the lack of mutual interests between rural and urban people all over the nation.

Parsons thought what was needed to cement better relationships between the two groups was "some sort of a coalition that could be brought about by some large-scale project of mutual benefit to both groups."

Pointing to thousands of idle acres in their state, Hoskins said that in his opinion a tree-planting project was the answer.

The two men, aided enthusiastically by Norfolk's young businessmen, found an ally in Tom V. Downing, assistant state supervisor of vocational agriculture in the state, and another in Ralph Bartholomew, district forester for the state at Portsmouth. Similar interest is now being stirred up by Jaycee groups in other states through county agents and 4-H clubs.

When other Jaycee chapters in Virginia saw what the Norfolk group was up to they started making inquiries asking in effect, "Is this a private affair or can anybody get in on it?" A total of thirty-two Virginia chapters are now enrolled in the project. Three of the big guns in the Virginia program have been C. Hall Snellings, state vice-president of the Virginia Jaycees; Horace E. Henderson, state president; and Archie Boswell, Norfolk president.

In due course the work of the Virginia Jaycee groups began to attract the attention of other Jaycee groups in the country. Consequently nobody was greatly surprised last year when Hoskins, with Parsons and his Norfolk contingent backing him, was named vice-chairman of the Junior Chamber's Agricultural Committee in charge of conservation.

With the Virginians at the helm, agricultural committee plans for a national tree-planting program took shape rapidly. A release to chapters all over the nation stated:

"It is felt that if all Jaycee Chapters purchase seedlings from their respective state-operated nurseries that the Jaycee organization could easily be responsible for planting ten million or more seedlings, with the farm youth groups doing the bulk of the planting after local arrange-

(*Turn to page* 38)

←◀ Norfolk Chapter President Archie Boswell launched National Jaycee Tree Planting program in presenting first bundle of pine seedlings to Vocational Agriculture Instructor Frank Pierce. Looking on (left to right) Jack Peoples and Horace Weatherly, FFA members, and L. S. Parsons, Jr., past president of Norfolk Jaycees who helped engineer the national program

Lightning in the Longleaf

(*From page* 11)

following complete defoliation by fire; its foot-long needles are fire repellant so that the bud is protected from injury; and its branching habit is sparse, reducing danger of fatal crown fires.

It is most susceptible to damage by fire in the period of initial height growth, when under three feet, but later shows remarkable resistance. Except in very dry periods, it can survive winter fires with practically no loss. It is vulnerable to summer fires occurring in dry periods, and burning in accumulated "rough" of three or more years, when entire stands may be killed. Under these severe conditions for survival it has become, by evolution, the most valuable pine in the South.

It is too much to expect of any species of tree or plant that it show equal ability to survive hazards that are diametrically opposite in character, such as fire and shade. Thus the longleaf pine has never developed tolerance of shade, except on very dry sites. Handicapped by an average five-year period before it can begin its height growth, it falls victim to the competition of loblolly and slash pines, oaks, and red gum, which begin their height growth in the first year. That is, of course, if these competitors are not killed back by fires. Even the shade of brush is fatal to longleaf seedlings.

A still stronger hazard, belatedly recognized, is that of the brown spot leaf disease (*Septoria acicola*) which, in its prevalent spore form, lives on the needles of the small seedlings while they are still in the grass, and on those beginning their height growth. When the disease becomes epidemic, it defoliates seedlings annually up to four feet in height, thus preventing the carryover of needles for the second season, without which not enough food can be stored in the roots to support the growth of the elongating stem. Three such defoliations of seedlings from one to four feet high cause death.

From 1928 on, it was found that a winter fire in about the third year, while completely defoliating the seedlings, eliminated the disease for the following year and resulted in a vigorous new needle crop. In the absence of subsequent annual fires, this vigor carried over to the second and third year, by which time another fire for disinfection was required. Healthy, rapid height growth then took place in the fifth or sixth year. Thus a fire "rotation" or interval of about three years was indicated as giving maximum development for the seedlings.

Hot summer fires or even fires in the first winter, after seed fall, killed practically all seedlings of the preceding fall crop. But the total exclusion of fire also resulted in the ultimate death of most of the seedlings from brown spot, though it has been demonstrated both at Urania and Bogalusa, Louisiana, that some individuals may escape the disease and form a stand of pine, though only after a delay of five to ten years beyond normal, due to defoliation.

Germination of seed is almost entirely prevented by a deep accumulation of grass "rough," three years old. Hence fires to remove the "rough" are the initial requirement for the establishment of the seedlings.

These facts lead to the conclusion that longleaf pine has been dependent on the occurrence of fire for its evolutionary development as a species distinct from other southern pines.

How do lightning fires start in the longleaf forest? In several recent instances of which careful record was made by observers, it was found that the trees struck were for the most part alive, which merely indicates that live trees constituted the most numerous targets. In one instance at Urania, a dead snag was struck and the grass and litter ignited at its base. In each instance recorded, the lightning storm was accompanied by a very light rain, and fires spread readily.

The effectiveness of modern fire control is indicated by the fact that for the 191 fires occurring in eight years in the longleaf pine type on southern national forests, the average acreage burned before control was around thirteen acres, and the total but 2508 acres. The 339,000-acre Conecuh National Forest in Alabama has had twenty lightning fires in as many years, which would have been about the right incidence and spread to have favored longleaf pine reproduction.

In the far West, lightning is a common and most troublesome source of forest fires, which tend to destroy entire stands of timber. In the South, the four principal species of pine, longleaf, slash, loblolly, and shortleaf, all show great resistance to fire. Hence fire in the southern forest does not often destroy the stand, except when fires have been excluded for periods long enough to create a dangerous accumulation of brush and ground cover.

The Forest Service has adapted its management of longleaf pine lands to the natural requirements of this pine, and prescribed burning is used on all longleaf areas at an average interval of three years, with special attention to burning in the years when a heavy crop of seed is produced, from three to seven years apart. Many private owners have also adopted regular periodic, but *not annual*, burning in order to restock their lands with natural seedlings wherever seed trees are present. It is also necessary to burn over plantations of longleaf pine, whenever the brown spot disease becomes epidemic. Neglect of this precaution has caused the loss of many such plantations.

Longleaf pine in pure, fully stocked stands, when obtained by the controlled use of fire, produces a crop of timber that may exceed in value that of any other southern pine or hardwood. This is due to the larger number of trees to the acre that can reach sizes merchantable for pulpwood (from thinnings); to the straightness of the tree which makes it suitable for poles and piles; and to its close grain and great strength, adapted equally for flooring and for structural timbers.

Now that the natural requirements of the species are understood and can be met, this pine holds the promise of being the main dependence for future timber supplies of that portion of the South embraced in its former natural range.

Death Claims Prominent Foresters

At the time of going to press, word was received of the deaths of three prominent American foresters.

Dr. Edmund Secrest, 68, director of the Ohio Agricultural Experiment Station, and former state forester of Ohio, passed away in Detroit.

Franklin W. Reed, 72, whose career began in the old Bureau of Forestry in 1902, and who later served as executive secretary of the Society of American Foresters, died after a long illness in Bradford, Vermont.

Axel H. Oxholm, 58, internationally known wood utilization specialist, who headed the Wood Utilization Committee during the Hoover Administration, died suddenly at Washington, D. C.

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Operation Gooseberry

(*From page* 21)

ready and loaded into the tanks of the waiting craft. Everything was all set for the history-making test run.

The objective was a forty-acre tract three miles to the north on the rough slope of Pine City Mountain, cut off from the spectators' view by a ridge rising 800 feet above the meadow. The test area, divided into eighteen plots to be sprayed with different dosages of 2,4-D, was a region of brush, snags, scattered pine, fir and oak. It was overrun with *Ribes*.

The task of digging out the *Ribes* on these forty acres would take a ten-man crew sixteen days, during which each man would travel at least ninety miles by truck and walk eighty miles carrying a five-pound mattock and his food and water. Now, one man in an air-borne sprayer would attempt to eradicate the plants in ten hours or less of actual flying time.

The sun was still behind the eastern ridge when operations began. In those early hours, the higher density of the cool morning air increases the lifting power of the rotors, and the still air minimizes drift and confines the spray to the specified strip. The supervisor at operations base made radio contact with the head flagman of the plot area, secured the ready signal and passed it on to Pilot Mitchell, who opened the throttle to accelerate the idling rotors. In a moment the helicopter was in the air.

Upon nearing his objective, Mitchell changed course slightly to start a "dry run." He had previously familiarized himself with the area by making ground surveys, studying aerial photographs and sketch maps. A half mile distant he spotted two flags—one white, one red—marking the mid points on the upper and lower boundaries to be sprayed.

On the "dry run" he checked his instruments, noted wind conditions, ground obstructions and positions of the flags. He observed that the plot lay with its long axis along the contour of a steep hillside. He made sure the "approach" and "escape" were safe at either end and that alternate strips could be flown in opposing directions.

Ready to begin spraying, Mitchell made a gliding run approaching the white flag at a speed of thirty miles an hour, and at a height of thirty feet. A hundred feet from the plot boundary, he punched the button that opens the spray valve, and two seconds later a uniform swath of red mist burst from the forty-four nozzles of the spray boom fixed to the fuselage. The spray solution had been dyed red to help in recording its distribution.

The mist, forced downward by the rotors, settled on the designated strip with amazing precision as the helicopter wheeled up and down the plot, spraying a swath about thirty-three feet wide on each run. On the ground the flagmen and camera-clicking observers watched almost incredulously. One acre of brush and *Ribes* that would have taken from thirty to forty man-hours to work by ground crews has been sprayed by helicopter in thirty seconds of actual flying time.

The plot finished, the recorder closed his notebook and started to pick up the paper discs showing the density and uniformity of the spray pattern. The flagmen barely had time to fight their way through entangling brush to the next station, for in six minutes the pilot was back with the next load of spray.

Such was the pattern of Operation Gooseberry which required fifty-four experimental spray flights to complete. All were made as effortlessly and successfully as the one described.

Though lacking the final tabulation on number of *Ribes* killed and dam-

AUTHORS

A. J. BROWN (*"IPPF" Makes Good*) is vice-president of *The Gulf Coast Lumberman*. **ARTHUR L. CENTER** (*Torrey Pine Park*) writes from Long Beach, California. **H. H. CHAPMAN** (*Lightning in the Longleaf*) is professor emeritus of forest management at Yale University. **H. BOWDEN FLETCHER** (*Masonite in Australia*) writes from New South Wales. **BOB FORBES** (*Museum for Trees*), formerly editor of *North Dakota Outdoors*, writes from Moscow, Idaho. **HENRY T. McKNIGHT** (*Adventuring in Trees and Grass*), television executive, owns and operates Cornwell Farm, in Virginia. **H. R. OFFORD** (*Operation Gooseberry*), senior pathologist, is with the Department of Agriculture's Bureau of Entomology and Plant Quarantine at Berkeley, California.

age to associated vegetation, qualified observers are pretty well agreed on the success of Operation Gooseberry. Their observations on the plots six weeks after spraying showed that sixteen ounces or more of the 2,4-D acid an acre caused significant damage to *Ribes* and other susceptible broadleaf plants, and only minor injury to the conifers. Damage was confined to fast-growing leaders or laterals on the exposed parts of trees.

On plots located in steep narrow draws which had been flown in only one direction, damage to *Ribes* was spotty, being most pronounced on the open-site bushes. It was agreed that in rugged terrain, aircraft should, whenever possible, apply sprays from two opposing directions to avoid leaving untreated spots in the "shadow" of tall trees, dense brush, rocks and stumps. Five gallons of spray solution an acre appeared to be adequate for uniform wetting of *Ribes* and brush of comparable size.

The flights also clearly demonstrated that the 178-horsepower helicopter could fly within thirty feet of the ground and spray *Ribes* at elevations of 5000 to 6000 feet in rugged terrain, but the ship did lack the power to hover or fly slowly over rough, uneven ground during the spray work. In open brush fields where the slope did not change abruptly, it was possible to fly within a few feet of the vegetation by maintaining an air speed of thirty miles an hour. If snags and trees were far enough apart, the pilot could fly below their level while spraying.

When the ship was forced to fly more than thirty feet above the ground, there was a noticeable loss of the rotor down-wash that plays such an important part in driving the spray throughout the vegetation. Narrow draws had to be flown downhill, but it was possible to spray steep, open hillsides along the contour or diagonally downhill.

It was the conclusion of observers at Operation Gooseberry that the helicopter holds considerable promise for similar work in the future. It is agreed, however, that its extensive use for the broadcast spraying of *Ribes* would depend on two developments: increased power for the ship, and spray equipment that will more effectively dispense small volumes of herbicide and control its distribution.

The use of the helicopter is also being considered for other phases of blister rust control work, such as moving personnel and equipment into remote areas, scouting for pine infection, and for recording the distribution of pine and *Ribes*.

GARDEN GUIDE

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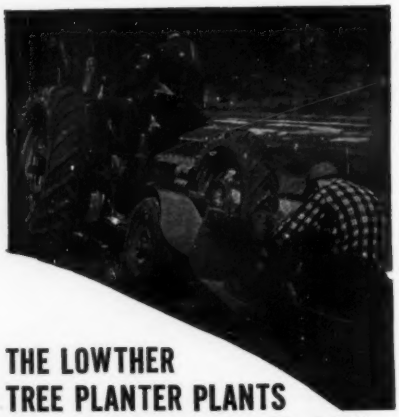

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A. G. Hall Enters Forestry Relations Field

A. G. Hall, forester for The American Forestry Association since 1947, resigned December 1 to enter the professional field as a forestry relations counsel and consulting forester. His services will include studies of forestry problems, program planning, public relations and a legislative reference service.

A graduate of the forestry school at Pennsylvania State College in 1933, Mr. Hall has served at various times with the U. S. Forest Service, and in state forestry work in New Jersey and Pennsylvania. In 1935 he was brought to Washington to prepare educational material for use in the Civilian Conservation Corps and co-authored the widely used book "CCC Forestry."

In 1943 he was assigned to the War Production Board as a forest economist, serving also as vice-chairman of the wartime forest production drive programs. At the time he joined the staff of The American Forestry Association in 1945, as associate editor of AMERICAN FORESTS and director of information, he was assistant chief of WPB's program branch of the lumber and lumber products division.

A. G. Hall

Mr. Hall will establish offices in Washington, D. C.

Jaycee Planting Program

(*From page* 33)

ments and local needs are ascertained."

The following program was recommended for individual chapters by the committee:

1. The state Jaycee president and agricultural chairman should meet with the state supervisor of vocational agriculture, extension forester with the Extension Service, the state forester or representatives of the U. S. Forest Service to determine the availability of seedlings from state-operated nurseries and the costs of seedlings per thousand delivered.

2. Each local president and his agricultural chairman should discuss this program with either the vocational agricultural teachers in their trading area or the county agent who supervises the 4-H Club work to determine the number of trees that could be planted locally by the farm youth groups.

3. A recommendation that each Jaycee chapter purchase 5,000 seedlings per "Ag" chapters or 4-H Club group in its trading area. Species of trees to be planted will be determined locally and can be planted for windbreaks, shelterbelts, erosion control or farm woodlot improvement.

4. Planting will be done with local farm youth groups with Jaycees assisting.

As a result of so much nationwide activity, Hoskins and Parsons are en-

(*Turn to page* 40)

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Jaycee Planting Program

(*From page* 38)

couraged in their belief that a coalition between young businessmen and farmers can accomplish much in working for conservation programs.

Jim Dixon, chairman of the Georgia Jaycee Tree Planting program, said, "As I see it, the purpose of this program is two-fold—to help and encourage Future Farmers to reforest wasted areas and to educate both urban and rural people as to the needs for reforestation and proper forest management."

Another reason the Jaycee tree-planting program may prove of considerable worth at this particular time is the fact that nursery stock, scarce after the war, is beginning to come back in quantity. This upswing will doubtless be accelerated by passage of recent amendments to the Clark-McNary Act.

Seedlings, already available by the millions, will continue to be available in greater quantity which indicates a need for tree-planting programs of the Jaycee variety. The Jaycees have apparently timed their program well.

The People's Land

(*From page* 14)

its great reservoirs and irrigation systems, and its industries from streams and rivers having their sources in the national forests, national parks, and grazing districts or from underground waters fed into the ground by these protected watersheds.

It is well known that the whole economy of the West rests upon dependable supplies of water stored and flowing from its mountain ranges. No other sources to which it may turn to meet present and growing needs for water are forseeable. Already water shortage in some sections of the West is a pressing problem. Clearly the great area of western mountain land now in federal ownership calls for a type of coordinated management that will assure conservation and development of its beneficial influence upon ground water storage, waterflows, soil retention, and flood abatement. Disposal to the states and to private ownership does not give such assurance. To the contrary, it hazards the future economy and the general welfare of the West which in turn hazards that of the entire nation.

In contrast, the federal government through appropriate administrative agencies is managing the lands under conservation programs designed to make them render their highest possible contributions to the general welfare. Except in the case of the national parks and some national monuments, whose primary purpose is to preserve outstanding works of nature against economic use, the remaining ninety-five percent of the lands are administered under systems of regulated use of all resources consistent with the conservation and development of primary values. Areas chiefly valuable as watersheds or as timber-growing or range lands are managed with those objects foremost.

Other uses are permitted insofar as they will not obstruct administration of the land for the purpose to which it is best adapted. This is application of the multiple-use principle of land management. It has been followed in the administration of the national forests for the past forty years. As other public lands have been designated for conservation management, the policy has been adopted for them. Permanently adhered to and faithfully and scientifically executed, it assures the public that the lands will be safeguarded against exploitation and receive integrated administration and development of its multiple resources.

Proponents of public-land disposal have at times contended that the public interest in the conservation and use of the lands will be safeguarded by enlightened land management engaged in by the states and private owners. While it is true that increasing numbers of private owners of forest and range lands are adopting improved practices, the number is a small minority. Among forest owners, for example, a recent survey by the government shows that only twenty-nine percent of owners of large forest properties are following lumbering methods that can be classed as good, while among small owners the percentage is less than ten percent. Private misuse of range resources is the rule rather than the exception. Nor is the record of the states in handling tracts of forest and range land, many of which are federal grants from the public domain made in past years, one to justify confidence in the contention.

Because of the scope, widespread distribution, and diversity of interrelated resources of water, wood, min-

erals, wildlife, and recreational opportunities which characterize the public lands, it seems clear that if these lands are to render permanently their highest services to the industrial and social life of the nation, any proposal that they be relinquished to the states or to private owners, directly or by way of the states, should carry with it dependable assurance that they will receive coordinated and effective management in the public interest comparable to that the federal government is able to provide. In the view of the committee this assurance is lacking.

It has been contended that liquidation of federal ownership of public lands will reduce the cost of government and lighten the federal tax burden upon the people. This seems a tenuous argument. While repudiation of the federal obligation of protection and conservation might reduce administrative costs in some degree, it will by no means eliminate them. Once the public lands are thrown open to state or private acquirement, those portions bearing the most valuable resources will be seized upon at once and those unadapted to profitable private ownership will be left on the hands of the government. There are millions of acres of such lands as evidenced by the large area of unreserved public domain which has been open to entry under existing public land laws for many years and is today sometimes referred to as "land nobody wants." Nevertheless their conservation is a public concern because of their isolated resources or their influence upon waterflow, local floods, soil erosion, and siltation of streams and reservoirs into which they drain.

The federal government cannot force the public lands into either state or private ownership even if it were the desire of the people to do so. The suggested disposal would surrender the lands bearing the most valuable resources and leave the lands of lower value still an obligation of the federal government. This would call for continuance of protective and administrative agencies, lower returns from the federal holdings and higher per acre costs of protection. Any savings made by relinquishing the most productive and valuable lands might well be offset many times over by subsequent costs which the national and local governments would be obligated to incur in repairing damage resulting from lack of management of the areas which had passed to state or private ownership,

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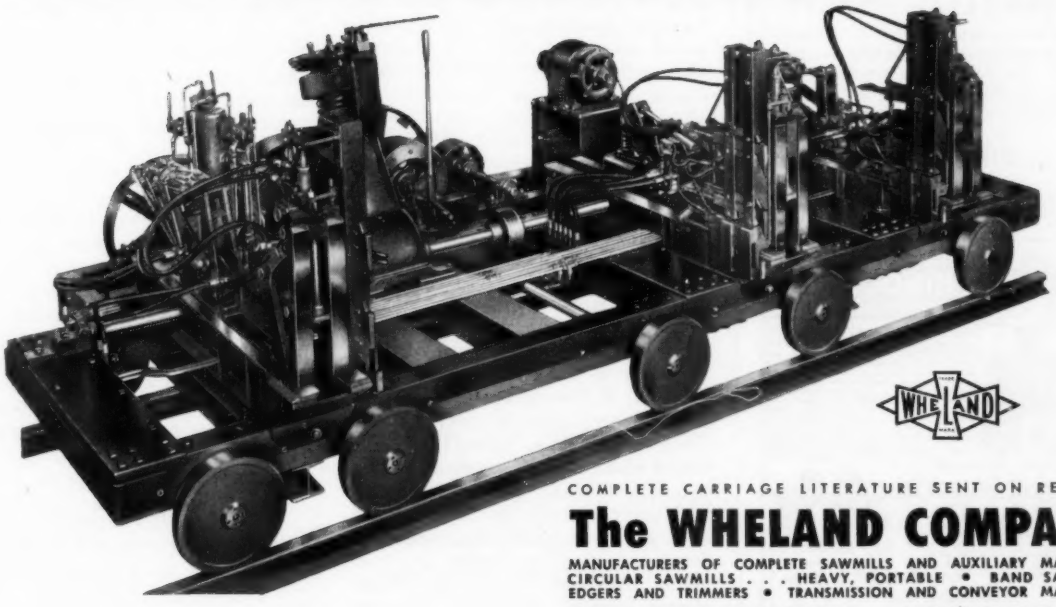

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and which might later revert to federal ownership.

Furthermore, the process would so dismember the public lands into divided and intermingled ownerships as to make unified or coordinated multiple-use administration ineffective, if not impossible. This would be critically true in the protection of watersheds and other surface resources against forest fires and epidemics of forest and plant destroying pests. Neither the states nor private owners are yet able to cope with these destructive agencies and the burden of protection would continue to rest upon the federal government.

The public lands are the people's lands. The costs of their administration, protection, and development over the past fifty years have been paid for by all the people. They represent a huge conservation investment made with the expectation that it will be safeguarded and will yield rich returns in making America a better and more abundant country for their children. There is no substantial evidence that the citizens of the country as a whole wish the investment dissipated. The storms of public protest that have followed suggestions to that end strongly indicate that they will not tolerate it.

Dams Are Not Enough

(*From page* 32)

and stones and trees and the everlasting hills.

VI

Another serious menace of the reservoir building program is the threat it offers to migratory fish, particularly on the Pacific Coast. Much damage has already been done—more may be in the offing if the numerous projects suggested by federal agencies in these areas are approved and built.

Proponents of schemes designed to exploit the unused water resources of the Pacific Northwest are inclined to belittle the difficulties of maintaining our remaining salmon and related fisheries. Generally speaking, engineers charged with responsibility for designing complex river developments recognize the threat they present to commercial and game fish. Usually, however, schemes to safeguard migratory fish have come as afterthoughts. Reliance has been placed largely on ingenious mechanical contrivances — fish ladders, screens, fish hatcheries, planting of small fish in new streams, and release of cold water, rather than on devices based on sound biological principles which would entail considerable, and in some cases drastic, alteration of basic designs.

It is no wonder, therefore, that biologists are taking an increasingly dim view of the efficacy of artificial measures to save the fisheries. As Dr. Paul R. Needham, former director of fisheries for the Oregon State Game Commission, remarks, "Until Grand Coulee Dam was built on the upper Columbia, fishery biologists had never been called upon to answer problems of the magnitude of those presented by Coulee. . . . A major backbone stream was completely blocked, and there was no previous experience upon which to formulate a plan. After the steam shovels had started work, somebody remembered that there were steelhead and chinook and sockeye salmon that would be blocked, and something ought to be done to save them if possible."

So a plan was worked out to trap the adult salmon on their return migration at a point below Grand Coulee and move them in tank trucks to open tributaries that enter the Columbia below the dam. They were also taken to a mammoth hatchery for holding, ripening, and egg taking. This unusual program cost $5,000,000. What is the result? "A few salmon are returning but the cost has been out of all proportion to the success."

Dr. Needham asserts that the rich fishery resources of the Columbia Basin are doomed if all the present plans of the dam builders go through. Many steelhead and salmon runs will be blocked. About seventy-five percent of the upper spawning grounds of the Columbia River has already been cut off. The salmon pack here has been reduced by half in recent years, partly owing to over-fishing and pollution but more perhaps to dam building.

Similar effects from dam construction on a smaller scale are observable among the migratory fish on the Atlantic Coast streams. And now the dam builders are appraising the possibilities of developing Alaska's rivers, the last great source of salmon on the American continent.

VII

The increasing biological disturbances and economic and social hardships created by what may be called the rage for dam building as a solution to the problems of water short-

ages and surpluses have led to mounting protests. It is time to take stock of the situation, before it is too late.

The value of well-conceived reservoirs, alone or in combination with other engineering works, has been proven beyond dispute. But there are physical and economic limits to their usefulness. As long as the watersheds continue to be misused, and plant cover and soils steadily deteriorate, engineering structures can be only partially successful, and in many cases will ultimately fail of their purpose.

Too many projects have been sold to Congress and the people on the basis of insufficient information and with prospects of benefits that did not—and cannot—wholly materialize. Nor have the cost estimates included the full damages from the permanent loss of productive land, or of the additional devices or structures that will need to be built in many cases to protect the original investment against sedimentation.

Moreover, there are other shortcomings to the engineering approach. Many streams do not readily lend themselves to such development. Reservoir sites, a precious natural resource, are definitely limited. Construction costs are sometimes too high, especially if flood control is the sole or chief aim. In such cases it would be the better part of wisdom to evacuate the flood plains entirely and let the river have its way. Many cities and communities in the eastern part of the United States subject to periodic floods have unwisely allowed real estate and industrial developments to usurp the flood plains of the great rivers. In many instances settlements might well be relocated as an alternative to forcing the taxpayer to pour more money into flood control contrivances which may not even be wholly successful.

Finally, the construction of dams and reservoirs, even where justified economically, may destroy irreplaceable natural resources which are part of the lasting heritage of the nation. Lands that would be washed out may be needed for crop production, for healthy community existence, and as habitats for scarce wildlife; or, they may possess unique recreational and esthetic values. As our population grows, these values will become even more precious.

In the past, projects have sometimes been undertaken lightly. We can no longer afford to invest the taxpayers' money in any scheme which is drummed up by special interests and high-pressured through Congress without giving all the peo-

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ple who would be affected by it an adequate opportunity to gauge the potential results.

Where the people have had a chance to study adequately the social and economic consequences of a proposed scheme they are sometimes successful in bringing about its modification.

Thus, the Corps of Engineers obtained from Congress approval to build a huge dam on the Osage River which would submerge wholly or largely nine towns in Kansas and Missouri and force 4000 people to relocate at a time when houses were scarcely to be had anywhere. Some rich mining lands and fifty miles of state and federal highways would have been destroyed in addition to 450 miles of county roads, forty-seven miles of power lines, 212 miles of telephone lines, seventeen rural schools, six churches, and twenty-two cemeteries. Justification for this prodigious undertaking was the *hope* that impoundment of the Osage waters would reduce the flood level of the Mississippi at Cairo by twelve inches.

So aroused were the potentially affected communities that a federal-state investigation was launched. The results convinced the local people that the proposal was against their best interests—and as a consequence the Corps of Engineers decided to choose another site that would be less destructive socially and economically.

This example proves that where the people are fully alert and the common weal is shown to be of greater importance than potential dollar benefits from a given project, the plans may be modified. It is of the utmost necessity, therefore, that the public be given ample opportunity to study engineering proposals in their initial stages so that they may be adequately considered in relation to all the values involved.

If, at the same time, it is possible to achieve the same ends by sound watershed practices, or by combining such practices with engineering measures, the attainment of maximum social benefits would be much more assured.

Winter Sports

(*From page* 17)

Major change in the operation of the seven key resort areas of the National Park Service will be at Mt. Rainier National Park where a new area has been opened up at Tipsoo Lake, on the east side of the park, according to John E. Doerr, chief naturalist for the park system.

Continual landslides and heavy snows in rugged Cayuse Pass, gateway to Paradise, has made road-clearance work too expensive to justify its continuance in winter, it is reported. Between 2000 and 3000 guests who formerly frolicked in the valley every winter weekend will be saddened to hear that Paradise will not be reopened this season.

To provide guests from nearby Seattle and Tacoma (three hours' traveling time) with a place to ski, the National Park Service is developing Tipsoo Lake. Warming huts and toilets, a rope tow, light lunch service and parking facilities will be available this season at this new resort, opened for day use only on an experimental basis. Overnight accommodations will not be available in the area.

Some improvements have been made at other national park winter resorts, principally at Deer Ridge in Olympic National Park. Yosemite, Crater Lake, Sequoia-Kings Canyon, Rocky Mountain and Lassen national parks expect to accommodate the usual number of winter sports visitors.

As usual this year, the skiers will have the fun and the resort operators the worry. Last season's slump hit many operators where it hurt. A normal ski season offers only twenty-seven weekends at best. If ten or more of these weekends are total losses due to bad weather and blocked roads, the operator stands to lose plenty.

In the future, operators will probably proceed somewhat more cautiously, refuse to gamble with unpredictable Mother Nature. The enthusiasts may grumble a little, but the operators will stay in business.

Westerners and northeasterners consider unlikely two years in a row of the 1948-49 variety. As Howard Blanchard, of the ski-minded Union Pacific Railroad commented, "There was never anything like last year in the eighty-year history of the railroad. It may not be repeated for another generation."

One bright spot for the western resort operators, in the event of another series of slashing storms, is the availability of more first-class snow-clearing equipment as the result of last year's blizzards. It might help some of them over a hump in the next few months.

Masonite in Australia

(*From page* 23)

can be rapidly dismantled, packed on motor trucks and moved to a new site without damage to the materials. Tents are universal for sleeping quarters.

The plan of silvicultural treatment has considerable interest as there are three different approaches conceived to suit the type of section being handled.

When the forest areas were acquired they fell into one of three distinct categories. The largest section had been denuded of all its millable logs. The second type was young growth which had come up on old farm clearings, not now used as such. The third was cleared grassland.

The cutover areas had first been combed for milling logs, then for poles, railroad ties and pit props, which resulted in only stunted, crooked and otherwise useless timber, which could not be applied to ordinary commercial purposes, being left. This timber was naturally preventing growth of the young trees to the best advantage. In treating these areas the first job has been to cut all the previously useless timber—trees which now can be utilized in the Masonite process.

Having removed this type of timber from the stand, a standardized system of regeneration is begun. First, completely useless trees—trees that are unsuited for the Masonite process—are cut and burned so as to leave the area as clear as possible for the reception of seed and the encouragement of coppice shoots.

Under normal conditions, it has been found that there is a rush of young growth which, at the end of two years, will require the second step, that of suckering. This process is aimed at reducing the stock to approximately 700 trees to the acre by selecting the best formed and straightest youngsters and cutting out all others. It has been found advisable to do this to prevent overpopulation stunting the growth and, at the same time, to bring the stand to the stage when a light fire can be run through the area, under controlled conditions, without damage to the remaining timber. Once this stage has been reached the area is not expected to require further attention, except normal fire protection, until it is due for the first thinning operation in approximately ten years.

Since the operation commenced several years ago, the plan has been applied to 1000 acres, covering a wide range of soils and types of timber. In every instance a fine stand of mixed seedlings and coppice shoots has resulted. Particularly in the Tarean area have the spotted gum, stringybark, peppermint and bloodwood made good growth.

In connection with the second category, a considerable area of land which had, at one time or other, been cleared for pasture and farming, was allowed to return to trees because of low prices for primary products, labor shortages, or war. On the coastal belts these rather unexpected additions to the forest may prove a vital factor in Australian timber supplies during the next generation.

In most cases, these volunteer stands, if that phrase might be applied, have come in so thickly that stagnation in growth is already a serious problem. In those stands controlled by the corporation, a program of thinning is in process, coupled with the cleaning up of undergrowth. The objective is to reduce the stand to the point where maximum growth can be assured the remaining trees. Naturally, a considerable amount of usable timber is

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Above—An FZZ or HPZZ is invaluable in fighting this type of fire which burned over 300 acres in Unity, New Hampshire. Photo courtesy of U. S. Forest Service.

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secured from these thinnings, but the main purpose is to speed up the date of the final cutting. During the thinning the actual final crop stand is reduced to approximately 150 trees to the acre. Each tree to be left is carefully selected and marked.

The final category is that of cleared grassland, and it has been decided that the only way to re-crop this type, if an adequate timber stocking is to be obtained quickly, is by planting seedlings. For this purpose a tree nursery is maintained.

This work is, as yet, largely experimental, but most of the local species have been tried out successfully, as well as a variety of pines, mainly *Pinus taeda* and *Pinus caribaea.*

Fire protection, of course is a vital factor in the whole program, As this is written, two fire-fighting units have been established and two more have been planned for the coming season.

Access roads and firebreaks are being constructed in cooperation with the Forest Commission.

It is felt that the successful scheme in the United States of a regional forest fire protection association, comprising all timberland owners, and including the Forestry Commission, should be formed to support unified fire organization financed by pro rata payments from the members. It is Masonite's intention to work steadily for the establishment of such an organization.

Italy Needs Trees

(*From page* 15)

again in at least a period of partial wood economy. Today scientists have discovered countless formerly unknown uses for wood which place it among the prime necessities of modern life.

"With a well-planned forestry program Italy could meet all the wood requirements for her industry—and also have much-needed fuel.

"There are problems to be solved, of course. One is how this vast program is to be undertaken—and by whom? And since it takes a long time for a reforestation program to show results, there is the question of what can be done to supply timber needs while the new forests are maturing.

"I cannot solve these problems for the people of Italy. But experience back home indicates the desirability, as a first step, of enlisting the support of organizations such as our Boy Scouts, ex-servicemen's clubs, the churches, or any continuing service groups as the Rotary and Kiwanis.

"The Ohio Agricultural Experiment Station is located in my home city of Wooster, and I am sure the men at the station will be only too happy to assist any group wishing to collect tree seeds for the Italian people. Indeed, it is possible the station might be induced to grow a limited number of seedlings for planting in Italy. And if space is not available at the station for this purpose, I shall be glad to set aside the necessary ground on my farm.

"Many men who are interested in this project and have a knowledge of forestry feel that three—or possibly five—year transplants would survive the voyage to Italy if properly packed. The expense of shipment, of course, would be part of the contribution of interested American groups. We could ask the Italian government to use trucks which the Americans have furnished to convey these little trees from the shipside to the region in which they are to be planted. Italian corporations and individuals with some means of transportation could assist. There are countless villages in the mountains where the citizens could make tree planting a community affair. In this way all the people of the community would be interested in protecting the trees. Children could be assigned ten to twenty trees each. Each child could care for his or her little plot—and watering and pruning would be part of the program."

These were my thoughts in 1945 as an Army officer on duty in Italy. Last summer I again visited that country after touring Ireland, Scotland, England, France, Austria and parts of Germany, and am now more convinced than ever that a reforestation plan is essential to the future prosperity and welfare of the Italian people. One cannot witness what forestry has accomplished in other regions, particularly in Austria and Bavaria, without reaching this conclusion.

In Italy I talked tree planting to Premier De Gasperi, Ambassador Dunne, ECA Chief of Mission Zellerback and many others, including Dominic Marcello with whom I worked in American Relief for Italy and who is also helping administer the Marshall Plan. I am pleased to report that all of these officials and especially those of the ECA in Italy, are extremely interested in an extensive reforestation program.

This Month With The AFA

We've had a number of nice letters from people who liked the November (Annual Meeting) issue of *American Forests*. One was from Lieutenant Colonel C. V. Clifton, General Omar N. Bradley's aide, who writes:

"The November issue of *American Forests* is on my desk before me and I want to thank you for the very beautiful spread you gave General Bradley.

"Erle Kauffman and Jim Craig certainly did themselves proud with the layout and the General asked particularly that his thanks and appreciation be directed to them.

"We were especially gratified to note the interpretation of General Bradley's speech in the editorial page of the magazine. The point brought out about conservation of our basic national resources was precisely what he had in mind as one of the important features of his talk."

Member George E. Sindt, of Long Island, New York, had this to say about the benefits he derived from the Annual Meeting:

"I would like to express the fact that I learned a great deal from the tour and talks. It was an education as much as it was a pleasure to hear what the various speakers had to say about their cooperative duties in connection with conservation as a whole. . . . I hope to be able to spread the information I obtained at the meeting to farmers and landowners of Long Island who are really the ones who should do something about conservation."

Our AFA can't miss making 1950, our Seventy-Fifth Anniversary, a banner year if our members all adopt the plan of attack proposed by Mr. Sindt in his letter.

Speaking of our magazine, Edward J. DeWitt, of the DeWitt Tree Farms, writes in to suggest that some of the material presented in *American Forests* is a little "too lofty" for the average John Doe—urges the use of more practical material like "A Sawmill Goes to the Logs" which appeared in the October issue.

Mr. DeWitt will be glad to learn that a former feature of the magazine, *Managing Your Woodlands*, is being reinstated in future issues. However, as we see it, one of our principal jobs is to stimulate thinking regarding what needs to be done on the whole land and water use picture. And, even more important, how it is to be done.

In connection with more "how-to-do-it" material it would be interesting to hear the opinions of readers on this subject — including those who own woodlands and those who don't. Actually, we have no idea how many of our readers own or work with woodlands and it would be interesting to find out.

Two life members from Pennsylvania, Horace C. Jenkins and Carl Getz, dropped in to see us last month. In discussing things that are needed both in conservation and by the AFA, Horace suggested that one of the things the AFA needs, in his opinion, is a good song.

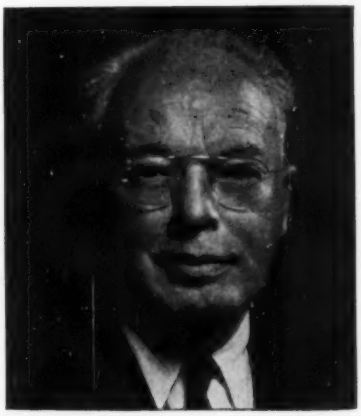
A little more conversation along this line revealed that Horace has actually written a song to the tune of Cornell's Alma Mater hymn, "Far Above Cayuga's Waters." The words:

"Here we stand God's sons and daughters
United in one band
To save the trees, the soil, the waters
Of our bounteous land.
We will work for conservation
Until that happy day
When all people of our nation
Hail our AFA.

S. L. F.

AFA President Wins Top Service Award

A WEST VIRGINIA power company executive who in 1935 resolved to put more meaning into the phrase "community action," with emphasis on the second word, has been awarded the Gnatt Medal, one of industry's top awards for community service, for sparking a self-help program in West Virginia that has upped payrolls at least $60,000,000 a year in the last seven years.



A. C. Spurr

The recipient, A. C. Spurr, president of the Monongahela Power Company and of The American Forestry Association, told members of the American Society of Mechanical Engineers meeting in New York on November 30, "Actually, there isn't a thing original about any of our programs unless it is the idea that a power company has a stake in conservation, forestry, farming and related community projects. . . . We are available to help wherever we can . . . to be a sort of cheerleader . . . and in some respects a coordinator."

Cheerleading, Monongahela style, has paid rich dividends in West Virginia the last fifteen years. A dwindling dairy industry has been revitalized; farm income has been boosted; 110 new industries have been installed; employment more than doubled. The fact that the power company today has 141,000 electric customers, compared to 68,000 in 1935, is proof enough for Mr. Spurr that sound land use is synonymous with good business.

How Monongahela branched off into such sidelines as buying and distributing pure-bred bulls to improve dairy herds is explained in part by the fact that the company employs a farm counselor as well as a full-time forester and soil and water conservationist—experts whose work is completely divorced from the power phases of the business.

EDITORIAL

The Right to Govern Themselves

When the United States Supreme Court on November 7 upheld the decision of the highest court in the State of Washington establishing the constitutionality of the state's forestry laws, it was generally recognized that conservation had won a signal victory. For here was the legal answer to the question of whether or not a state can, under the constitution, regulate the operations of private forest enterprise in the public interest.

The *New York Times*, for example, although far removed from Washington's Pend Oreille County where the issue originated, saw in the decision "the seal of approval on a principle that may well have profound influence on the future well-being of this country." Its importance, the *Times* stated editorially, "lies in its endorsement of the theory—still somewhat novel to most Americans—that private owners of the nation's renewable natural resources do not have the unqualified liberty to use and destroy them as they see fit. The court has held, in effect, that they bear a deep responsibility to the nation as a whole, and to generations to come, and if they do not recognize this responsibility, the state has the right and the duty of forcing it upon them."

The Washington Supreme Court stated this same philosophy in different words. Pointing out in a review of its decision that a great "unwritten compact" exists between "the dead, the living, and the unborn," the court believes that "Such a compact requires that we leave to the unborn something more than debts and depleted natural resources. Surely, where natural resources can be utilized and at the same time perpetuated for future generations, what has been called 'constitutional morality' requires that we do so."

The foundation of any conservation policy, of course, must rest on this reasoning. And since we cannot rely solely upon voluntary and cooperative action to stop forest destruction, state laws should require, to quote from The American Forestry Association's Program for American Forestry, "that forest owners avoid unnecessary destruction of growing stock and young growth and follow practices that will maintain continuous forest production. . . ."

Thus we join in applauding the action of the Supreme Court. But we do so fully aware of its implications and dangers where the American way of life is concerned. Foremost in mind is that the court's affirmation of the state's right to regulate, to a degree at least, the operations of private forest enterprise, could be followed in the not too-distant future by a similar decision in favor of regulation by national, regional, or valley governments. The pattern is written in the trends of our time.

It is vitally important, therefore, that this significant fact concerning the issue involved be clearly understood: the Washington State law regulating timber growing and harvesting on private lands was developed largely with the advice and assistance of the wood-producing and wood-using industries of that state. Thus, in effect, what the Supreme Court upheld was the right of the people of Washington to govern themselves.

Federal regulationists, of course, will not see it this way. The fact that one or several states—actually there are seventeen in all—have taken action on their own initiative to improve their forest position is lost in the drumbeat of propaganda that only by approaching the problem of forest management on a national level can it be solved.

To those who reason objectively, this borders on hokum. A local problem, simply because of its widespread occurrence, does not necessarily become a problem of the federal government—nor of a regional government, nor a valley government. If this were true, the collection and disposal of garbage might at one time have been considered a national problem to be solved only by the national government. The same can be said about the absence of adequate telephone communications. These problems, like many others, were satisfactorily met either by local governments or by industry—and far more economically than would have been the case under federal law. Their solutions arose when local governments and industries became aware of responsibilities and economic opportunities.

In forestry, the movement over the years toward sound conservation practices admittedly has been slow. But at that, it has kept reasonable pace with the problem. Now that it is gaining momentum in the important forest-producing states and among major owners of forest land, the cry of federal regulation should logically diminish. That it is mounting instead would indicate, it seems, that the case of federal regulation is more ideological than practical. If this is true, advocates can be expected to capitalize upon every advancement carved out for forestry. And unless the people of the country, like the good citizens of the State of Washington, consider the facts and take the required action, there is little to stop them.

As repeatedly stated here, we are convinced that the answer to sound forest management in the democratic way lies with local governments and with the landowners—not in federal controls. We also believe that as long as the threat of federal domination hangs high, state and local progress in forestry will suffer. For example, it is only good sense to reason that funds and energies now being spent to fight the threat might otherwise be expended in sound conservation practices. Hence, the very existence of this threat slows the pace and increases the cost of state and private enterprise—a condition, paradoxically, that strengthens the arguments of federal planners.

This, obviously, is not a healthy condition. Whether or not it will be corrected by the decision of the Supreme Court remains to be seen. We feel very strongly, however, that if those in a position to practice forestry on the ground can be assured the court really affirmed the right of the people to govern themselves, we may expect major advancements in the management of the nation's commercial forest land. And, conceivably, the end of the federal domination threat.

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W. N. Burden, Councilman

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Mrs. Jennie J. Brackett

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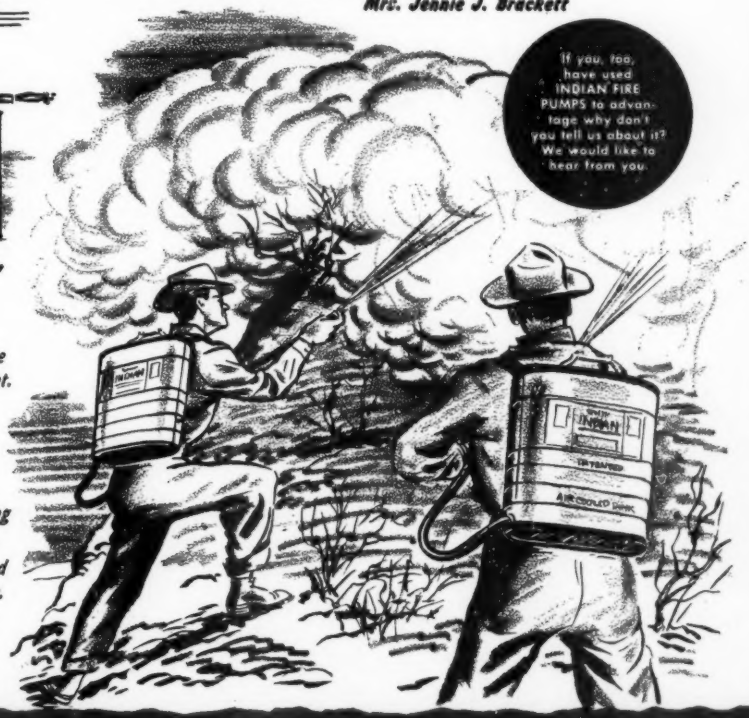
Timothy G. Stillman
Fire Protection Laboratory



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